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First Instalment?

THE extent to which the forthcoming increases in British Railways and London Transport fares and rates are harbingers of others, remains to be seen. The additional £9,000,000 a year which the British Transport Commission expects from them contributes little to the £40,000,000 needed to cover the additions to railwaymen's wages which may be made in accordance with the recommendations of the Guillebaud Committee. This may not be the last occasion on which railway users must help to pay for rises in railway wages. Details of the new fares and rates are given elsewhere in this issue. The limit of charges has probably been reached beyond which the nationalised transport undertaking will start pricing itself out of the market, though an inflationary tendency might result in the need for further rises. If indeed, with the present degree of competition in transport, it is expedient to add to railway charges at all, those now selected seem the least objectionable. Adjustments in freight rates are confined to small consignments—an unprofitable traffic. As to passenger fares the most noteworthy feature of the new measures is the latitude given to the Area Boards of the Commission to approve variations from the general level in the several Regions of British Railways. This is a step in that decentralisation of which the Government has declared itself in favour, when the decision was made to set up the Advisory Group to examine the structure of nationalised transport. The Regions for some time have been taking advantage of their freedom to quote mid-week, excursion, and other reduced fares. Coming only five months after the last increase in fares, in November, the proposed increases have aroused much criticism from passenger associations and some daily newspapers, more particularly with regard to season ticket rates. The rise in the latter will probably leave many rates at unremunerative levels. Whatever their deficiencies, the new increases have been proposed after study by the staffs of British Railways and London Transport Executive. It is to be hoped that the Government will not, as did a Conservative predecessor some years ago, in deference to popular clamour in the matter of passenger fares, and as the present Government did in February, yielding to the threat of a strike over railwaymen's wages, constrain the Commission to take action against its better financial judgment.

In Conference

SO far, little has been heard from the group which has been appointed by the Minister of Transport to advise the British Transport Commission on the operation of its activities. The group's first meeting on April 12 has been followed by four others, at one of which representatives of the N.U.R. and T.S.S.A. were also present—representatives of A.S.L.E.F. will meet the group next week. Although the unions later described their call as a "courtesy" visit, more than two hours were spent by both sides in getting to know one another. This was apparently all the new knowledge gained by the unions, for no clear answer was given to their inquiries on the scope of the group's work and, in particular, as to whether it would embrace the Commission's problems concerning the servicing of its capital. The unions remain sceptical about the purpose of the advisory body and are convinced that it will merely implement Government policy. This might well be—the group has been joined by two senior Civil Servants. Both anonymous, one hails from the Ministry of Transport, and the other from the Treasury.

Pakistan Railways 1955-1959

THE preliminary report of the Pakistan Planning Commission shows that during the first four years, 1955-59, of the First Five-Year Plan, the railways spent £21,470,000—against the total five-year allocation of £23,400,000—on rolling stock. Locomotive, carriage and wagon replacements were all up to, or better than the target figures except for 5-ft. 6-in. gauge wagons, which were only 55 per cent. The manufacturing capacity in broad-gauge wagons was built up from nil to 1,000 a year. On the Eastern Bengal Railway it is planned to build 250 wagons, presumably of metre gauge, annually, and to construct all-steel all-welded coaches. The civil engineering department laid 650 miles of rail, renewed 1,100 miles of sleepers, and laid 15,000 concrete sleepers each year. There were considerable increases in traffic and improvements in operating efficiency. By March, 1958, 120 diesel locomotives were in traffic, working all important Karachi-Lahore services. During 1959, 25 950-h.p. Alco locomotives were added to the stock.

Re-organisation in Algeria

A CENTURY after construction in 1860-62 of the first line in Algeria, from Algiers to Blida, opened in 1862, a further re-organisation is taking place. The agreement signed on June 30, 1959, between the French Government and the French National Railways Company (S.N.C.F.), setting up a French National Railways (Algeria) Company (S.N.C.F.A.), has been ratified. In 1933, the railways of Algeria came under the management of a joint administration, the Chemins de Fer Algériens, which incorporated the Algerian State Railways and the Algerian System of the former Paris Lyons & Mediterranean Railway (P.L.M.A.); the latter had worked the Algiers-Blida and other lines built by private enterprise

and by the State, and the State Railways also comprised sections constructed under varying auspices. Since January 1, 1939, the whole of the Algerian railway system has been worked on behalf of the Government of the territory by a special department, the Administration des Chemins de Fer Algériens (C.F.A.). Of the 500,000,000 francs capital of the newly-created S.N.C.F.A., 255,000,000 is to be owned by the State and 245,000,000 by the S.N.C.F. The structure of the new company closely resembles that of the S.N.C.F.

Expansion of Westinghouse Indian Subsidiary

FOR over 50 years Saxby & Farmer (India) Private Limited, the Indian subsidiary of the Westinghouse Brake & Signal Co. Ltd., has been manufacturing complete mechanical signalling and, for nearly 10 years, electric signalling equipment, in India. As production of electric equipment increased, an additional factory was established in 1956 and plans made to expand at a steady rate. Because, however, of the acceleration of the Indian railway development programme and the report made by Mr. John Ratter, Member of the British Transport Commission, after his recent visit to Asia as chairman of the U.K. delegation to the E.C.A.F.E. Conference, Westinghouse has arranged with Saxby & Farmer for more rapid expansion of indigenous production of electric signalling equipment, so that within a relatively short period Saxby & Farmer will be in a position to undertake substantially the whole of the technical, manufacturing, and installation work for complete installations. The expansion will comprise C.T.C., mechanised marshalling yards, power interlockings, automatic block signalling, level crossing protection, and so on. The necessary specialist knowledge will be supplied to Saxby & Farmer by Westinghouse and will incorporate the latest available experience gained through that firm's world-wide connections.

Closing Unremunerative Railways

THE suggestion that Transport Users' Consultative Committees are vacillating in their attitude to proposals by the British Transport Commission to withdraw railway services, because the Government may decide that more unremunerative lines must be closed, is denied by Mr. J. C. Chambers, Secretary of the Central Transport Consultative Committee for Great Britain, in a letter to *The Guardian*. There is no case pending, he states, where a committee has held up a recommendation for this reason. The committees are very much aware of the need for the Commission to be able to operate railways as economically as possible, but the Minister of Transport also expects committees to consider these possible economies in relation to public hardship, and until he directs them to do otherwise they will continue to carry out their duties as they have done hitherto. To close down a line, Mr. Chambers points out, takes much longer than the two months or much less—perhaps even a few days—normally needed to deal with an application for closure, and while that is being considered, the railways can carry out some preparatory processes. The committees, therefore, are hardly obstacles to closure where that is justified.

Proposed Changes in MacBrayne Steamer Services

SHIPPING services in the Western Islands of Scotland have been provided for many years by David MacBrayne Limited, in which the British Transport Commission, as successor to the London Midland & Scottish Railway, holds an interest. Many passenger services are run in connection with the Scottish Region of British Railways, as for instance those between the rail-served mainland ports of Oban, Mallaig, and the Kyle of Lochalsh, and the Hebrides and Skye. The growing demand for inter-island road links is now considered to call for a new pattern of transport. Mr. C. B. Leith, General Manager of David MacBrayne Limited, has described his firm's provisional proposals. The company is seeking Government approval for short sea passages, which will involve replacement of its conventional fleet by short-haul road vehicle ferries. Such vessels, he states, might operate between Mallaig and Armadale, in Skye ; and between Oban, Mull, and Morven. None of the proposed developments seems likely to result in a basic change in the long-distance rail and steamer connections between the larger centres and the islands.

Improved Poster Map of London Underground

COLOURED poster maps of the London Underground system have been displayed at stations in London and elsewhere for half-a-century or more. A map issued before the war of 1914-18 by the then Underground Group showed all the railways which are now part of the London Transport Executive system, including the Metropolitan and other lines not in the Group. A diagrammatic poster map, first issued by the London Passenger Transport Board, and revised by it and its successor, L.T.E., has been a familiar feature for the past 30 years. It has now been improved, as described briefly on page 522. Only main interchange stations are shown in capitals, which makes it easier to read. Stations which close on Sundays are specially marked. No Piccadilly/Northern City Lines interchange is shown at Finsbury Park. The portion showing L.T.E. lines in Central London is to be reproduced for display in Underground trains alongside route diagrams. The new map does not feature the projected Victoria Line.

British Transport Staff College

THE purpose of every Staff College is to mould and develop character as well as to instil the specialised knowledge which is necessary for the performance of executive duties. At the British Transport Staff College at Woking, the 16-week course is hardly of sufficient length to " mould and develop " the characters of its members. Even were its duration to be extended, this aim would be an impracticable one, for the average age of its members is 42. Nevertheless, every effort is made to encourage initiative, self-confidence, and clear thinking, the qualities without which no executive can be considered successful. As will be seen from the article published on pages 506-9 of this issue, the College method lays stress on what may be termed mutual and self-instruction: a method which, while it currently enjoys the adjective " modern," was known and valued in Socratic Greece. Less tangible aids to study at Woking are to be found in the atmosphere of relaxation produced by unusually good interior decoration and furnishing, and, most important, by creation of a "club" atmosphere.

Aluminium in Rolling Stock Construction

ALUMINIUM has long been an accepted material of construction for all types of road transport vehicles. In the railway field progress has been less apparent, but there are signs that railway engineers, who have for some time been aware of the benefits to be derived from the metal, are now turning to it as a means of improving efficiency. To review the latest developments in the use of aluminium as a material for rolling stock construction a symposium is to be held jointly by the Institution of Locomotive Engineers and the Aluminium Development Association at the Institution of Mechanical Engineers on May 27. The morning session will be devoted to five papers under the general heading "Design and construction" while in the afternoon eight papers will deal with operation and service experience. The papers, details of which are given on page 517, will be briefly introduced, in most cases by the authors, so that the maximum session time will be available for discussion. The symposium will be opened by Mr. R. A. Smeddle, President of the Institution of Locomotive Engineers.

Scandinavian Diner Services

THERE are three features, at least, which are common to the restaurant car services in Sweden and Norway. First, in each case the services are provided by a wholly-owned subsidiary of the State Railway, namely, in Sweden, the A.B. Trafikrestauranger, owned by the SJ, and, in Norway, the A/S Norsk Spisevognselskap, owned by the N.S.B. Secondly, there is the extraordinary spaciousness given by the extra width of the Scandinavian loading gauge, which is wider than those of the Berne and U.I.C. standards, and enables an inside width of 10 ft. to be provided. Thirdly, there is the variety of the menu, and the service of food more or less throughout the whole course of a journey. In many cases leaflets distributed throughout the train give the times of table d'hôte services and then give the specific hours for à la carte services, alongside the train timetable. Normally the à la carte menus provide at least six alternative hot and cold dishes, plus bread,

cakes, hot and cold drinks, which can be obtained at any time the table d'hôte is not being served; and certain main-line trains in Sweden also have special menus for children.

High-Capacity Lightweight Container

TRAFFIC officers and designers of containers have long been seeking materials from which can be made containers which are durable, resistant to corrosion and damp, proof against vermin, capable of withstanding the impacts unavoidable in handling in depots and on the premises of consignors and consignees, economical of space, inexpensive to maintain, and light enough to afford easy handling. Such a paragon may be impossible to create, but an experimental fibreglass/plastic container built for British Railways, North Eastern Region, by Willerby Plastics Limited, has been shown in tests and in usage to embody several of the advantages sought. It is described briefly elsewhere in this issue. Its outstanding characteristic is lightness. The weight is only half that of a wooden container of the same dimensions, but the load of 5 tons is 1 ton more than that of the largest of the conventional types.

A.C. Possibilities in New South Wales

CONNECTING the heavily industrialised Port Kembla area with the Southern line at Moss Vale, the New South Wales Government Railways 38-mile single-track Moss Vale–Unanderra line carries heavy traffic in both directions, which should be considerably heavier in the next five years because of the greater production and planned expansion at Port Kembla Steelworks. A 12-mile section of 1 in 30 grade and numerous 10-ch. curves has long proved an operational hazard because the location of the track does not permit duplication. An investigation is now being made to decide whether the present diesel motive power should be retained or be replaced by a suitable form of electrification. It is felt that electric power would enable heavier trains to be operated at faster speeds thus increasing track capacity. Electrification, if decided upon, would probably be on a 25-kV. 50-cycle a.c. system to reduce the higher capital outlay of a d.c. installation. Locomotives could be designed to operate at 25 kV. as well as the N.S.W.G.R. existing 1,500-V. d.c. network.

Railways Essential to National Economy

THE essential role of the railways in the economy of Great Britain, whatever might be the losses on their working, was stressed by Mr. Ernest Marples, Minister of Transport, in opening the Institute of Transport Congress at the Waldorf Hotel, W.C.2, on Wednesday. The losses on railway operation, he pointed out, must continue during the present difficult period of modernisation. The density of population and short distances in this country aggravated the problem, and he paid a tribute to the efficiency of the British Transport Commission and to the managements of British Railways in improving and bringing up to date a system inherited from a past age. Mr. Marples re-iterated his belief that the new principle of propulsion embodied in the hovercraft would have far-reaching effects when applied to railways and other forms of land transport. He also emphasised the difficulty of rapid action by Government departments in the face of statutory restrictions.

Locomotive and Rolling Stock Display

THE extent to which British Railways has used and is using the latest-developed techniques in design and construction of the electric and diesel locomotives and passenger and goods vehicles could be seen at Marylebone Goods Depot this week. On Wednesday and Thursday, in connection with the Institute of Transport Congress, 1960, exhibits at a special display ranged from a Type "A" a.c. electric locomotive for main-line service between Euston and Manchester and Liverpool, to a light-alloy container. Other exhibits were a 675-V. electric locomotive for the Southern Region; Type "2" and Type "4" diesel-electric locomotives; multiple-unit stock for a.c. electric lines; a trailer composite for a four-car diesel suburban set; sleeping and refreshment cars; and wagons for powdered substances and other special traffics.

State Control of Transport

THE controls and restrictions which the State has exercised over inland transport in Britain are discussed in a paper, "The State and transport economics," presented to the Institute of Transport Congress at the Waldorf Hotel, London, W.C.2, last Wednesday, by Sir Gilmour Jenkins, a Past President of the Institute and lately Permanent Secretary, Ministry of Transport & Civil Aviation. Over the railways, he observes, a rather haphazard control by Parliament in the middle of last century over the building and operation of the system—or rather over the multiplicity of railway enterprises, some large but many quite small, which made up what has since become a system—was followed by the imposition of very severe limitations on their charging powers.

These limitations were the protection of the customer against a carrier who was virtually a monopolist, but they continued long after the monopoly had disappeared except perhaps for a few special types of traffic. Sir Gilmour Jenkins stresses that it was evident, in the discussions which preceded the Transport Act of 1953, with how much anxiety the trading community and other interests, such as the independent ports, contemplated the removal of many of those restrictions on the freedom of action of a unified railway authority. What have been the broad economic effects of the restrictions, of the amalgamation of more than 100 railway companies into four in 1921, and of the further merging into a single financial unit on nationalisation in 1947, is an academic question. To answer it would involve some estimate of what course events would have taken had the railways been given greater freedom in charging 40 years ago, when road competition was beginning to become effective. As regards road passenger transport he believes that the Road Traffic Act of 1930 made possible the building up of an efficient system of bus and coach services which has served the country well; but it has certainly had its effect on the railways, not least in long-distance motorcoach services. He overestimates, perhaps, the effect of the long-distance motorcoach on the train. It is the private motorcar which competes with the passenger train today, though the motorcoach was an important factor before the last war.

With goods services, it is harder to estimate the effects of the licensing system because of the enormous growth of the "C" licence fleet, carrying merchandise which otherwise would go by rail or by hauliers' vehicles. One of the tests of the success of railway modernisation, he maintains, may well be the extent to which, by better service and attractive rates, British Railways can win back traffic which the trader now carries in his own vehicles.

The actions of the State in relation to the finances of the railways are dealt with at some length in the paper, though even then it is no more than an outline summary. Sir Gilmour Jenkins does so, not because the financial history of nineteenth century railways has any direct bearing on transport problems now, but to show how little transport has been allowed to develop in obedience to past economic laws even in the century of *laissez-faire* in economic policy. This was so "not because Governments in the last half of last century were bursting to interfere," but because they were compelled to do so by the pressure of other interests. The railways held a virtual monopoly and were feared and restricted accordingly. The restrictions persisted long after they had ceased to be a monopoly, and the suspicion of possible arbitrary action is by no means dead. The provisions as to reasonable charges, the safeguards for independent ports, and the rather tenuous safeguards for coasting shipping, are examples of the results of this suspicion. They are also, he observes, a warning.

He mentions one rather unexpected result of nationalisation: the belief in the public mind that the Government was thenceforward responsible for railway charges. This would not have mattered so much if Governments, of all parties, had not proved unduly sensitive to this belief. The result of their fear of the political consequences of increases in rail charges has been to delay all applications by the British Transport Commission to increase charges. In a time of rapid inflation, the financial damage to the Commission has been very serious.

The concern of the Government in railway safety also must be borne in mind. Here the story has been the opposite of that in financial and economic matters—the minimum of interference. The Railway Inspectorate, formerly of the Board of

Trade, now of the Ministry of Transport, was set up in 1840 and has always been small. Today it consists of a Chief Inspecting Officer and three Inspecting Officers, with a Senior and three other Railway Employment Officers. The Inspecting Officers have power to inspect new passenger lines and alterations to them. They also conduct inquiries into train accidents, while the Railway Employment Officers deal with accidents to railway staff. Their findings cannot be enforced by law, but are made effective by agreement with the railway authorities, between whom and the Inspectorate there has always been the closest confidence and co-operation. The system has worked well.

Channel Tunnel Possibilities

IN view of the high carrying capacity of a railway compared with other forms of land transport, and of the difficulty of ventilating a road tunnel, apart from its psychological effect on road vehicle drivers, it is not surprising that the Channel Study Group is in favour of a railway tunnel under the Channel. Account has been taken of the development of road transport to the extent of envisaging the movement of a large proportion of traffic through the tunnel in road vehicles loaded on railway wagons. The Group includes two men with long experience of railway problems: Monsieur Louis Armand, former President of the French National Railways, and Mr. A. B. B. Valentine, Chairman of the London Transport Executive and Member of the British Transport Commission. The British and French chairmen of the Group are respectively Sir Ivone Kirkpatrick and Monsieur René Massigli, both with distinguished records in the Foreign Services of their countries.

The report, summarised briefly elsewhere in this issue, states that from a technical point of view, the best means of linking Great Britain and France would be, in the first stage at least, a railway tunnel, bored or immersed, which would at the same time provide adequate and convenient transport facilities for motorcars, motorcoaches, and lorries. The immediate cost, exclusive of finance charges, of the whole project would be approximately £109 million. Of this total it is estimated that about £29 million will be required to cover the cost of installations, terminals, and rolling stock. It is proposed that the provision of this sum should be the responsibility of the British Transport Commission and the French National Railways. The financial study shows that it is proposed to raise privately only the capital required to cover the cost of the bare tunnel from portal to portal. This is estimated at £80 million, to which must be added £20 million finance and other charges. It should be possible, it is stated, to obtain this sum from private sources of finance, provided that exemptions, guarantees, and assurances are forthcoming. As regards the guarantees, it has been suggested that the British and French Governments are expected by the Study Group to take action tantamount to underwriting the tunnel at the taxpayers' expense. A British member of the Group, Mr. Leo d'Erlanger has stated in a letter to *The Times* that the Study Group proposes to base a large part of the financial scheme it has in mind upon a rental agreement for the tunnel to be freely negotiated with the British Transport Commission and the S.N.C.F., and that in the light of exploratory discussions with the two transport systems the Group believes that a reasonable rental and an equitable division of receipts over and above the rental can be readily reached.

As regards the cost of the terminal facilities, railway equipment, and rolling stock, if the Commission and the S.N.C.F. consider that the prospective return to them warrants the requisite investment, this decision it is suggested, should be left to them subject to any Government consent which may be required. Such a rental agreement Mr. d'Erlanger considers, would be considered by investors as a sound basis for the issue of bonds. But as it would be the intention to offer these bonds simultaneously in other financial centres of the western hemisphere it might be necessary to ask for an assurance from both Governments that their railway systems would not default on their rental, so as to make the bonds eligible as an investment by certain important institutions.

Some of the railway aspects of operating through the tunnel were considered in our March 11 and 25 issues. The tunnel would be operated jointly by the British and French Railways under a long lease from the Channel Tunnel Company. The rental paid by the railways would include a guaranteed minimum, adequate to cover interest and amortisation payments on the bonds. The two Governments would be asked to guarantee the undertakings of the railways towards the Tunnel Company. The Study Group proposes that the company should be a single international company, set up by a Franco-British Treaty. If the Governments give their approval, in principle, to a Channel Tunnel the Study Group suggests that they should appoint an Inter-governmental Commission to discuss with the Group the detailed execution of the project.

Reception of the proposals so far has been mixed. Opposition is likely from those interested in rival means of transport, and there may be doubts, albeit unjustified, in the minds of those who underestimate the ability of railways to move the traffic satisfactorily. Little opposition has been expressed so far on strategic grounds.

The British Transport Commission, in examining the matter, must bear in mind the probable need to write off the value of some ships in the cross-Channel services. The prospects for passenger and goods traffic seem good, especially as trade between Britain and the Continent increases. But the sums at stake are too large for any but most careful consideration before a decision is made.

Steel Wheels and Tyres

AMONG the better-known general vehicle design factors which tend to accelerate the wear-rate of railway wheels are high axleload, small wheel size, a long rigid wheelbase, high unsprung weight, and the absence of pony trucks on bogies. Due allowance can be made for most of the individual and combined effects of these when designing new rolling stock for operation under known service conditions. Among other aspects of wheel wear, some indication of the additional importance of high thermal and dynamic stresses associated with the generation of excessive heat may be gained from the increasingly widespread adoption of automatic gear for reducing wheel-spin during the acceleration of driving axles and wheel-slip when heavy braking is applied.

It may well be that the present relatively low incidence of fatigue cracks due to thermal and corrosion effects will rise considerably if the present trend continues towards higher axleloads and speeds coupled with reduction of the wheel sizes of motive power units. In fact, a much better understanding is needed of the serious dangers which can arise from the generation of excessive heat both in solid wheels and those with shrunk-on tyres. Metallurgical and fatigue problems which occur in the design and use throughout the world of steel wheels and tyres and some of the research work being undertaken in this country to establish improved safety and reliability standards are given prominence in a paper by Mr. C. F. Ryan and Dr. B. B. Hundy read earlier this week before a meeting in London of the Institution of Locomotive Engineers.

Most fatigue cracks of the web or tread are found to start from a stress raiser such as a thermal crack or an inclusion of foreign matter. Another source of fatigue failure can be a hair-line caused by hydrogen in high-carbon steels made by the basic process, the one serious disadvantage remaining with this type of steel compared with acid steels. Shelling of wheel treads, when associated with thermal cracks starting below the surface, is known as spalling to distinguish the cause from pure overload conditions. Apart from the danger of local hard and brittle martensitic formations occurring in the steel as a result of rapid cooling from any temperature above 700° C. other thermal troubles can arise in conditions where brake loading might not be regarded as severe. For instance, American work suggests that when brakes are used to check a train on a long down gradient tensile stresses as high as 35 tons per sq. in. developed in the web of a one-piece solid wheel can lead to its fracture because of expansion of the rim at temperatures of only about 200° C. Furthermore, the main disadvantage of the tyred wheel under these conditions of service, that of differential expansion allowing the tyre to move round the centre, has led the railways of Canada and the United States to standardise on solid one-piece wheels. It is considered that thermal cracking is less likely with composition brake blocks provided the loading is adjusted to give the same retardation as with cast-iron blocks. A completely fresh design of wheel with integral braking disc is stated to be very promising in trials for British Railways.

In comparing the advantages of rolled-steel wheels with

cast steel the authors quote results obtained with a special wheel-testing machine to show that, for a similar analysis and strength, the cast wheel is more prone to develop thermal cracks. Also service tests under a 70-ton ore wagon have shown that cast wheels are more susceptible to shelling although the wear rate of both types is similar. British Railways use rolled wheels; in the manufacture of these the working and refining of the grain structure improves the fatigue-resistance and ductility and the thinner web enables the wheel to be lighter than the cast type and more resilient. Heat treatment can be of great importance and comparative figures are quoted to show the effects obtained on the tensile strength and elasticity by different methods such as normalising and rim-spraying compared with the practice, more common in the past, of cooling in still air after rolling. The process of hardening the tread by spraying it with water for a predetermined length of time while hot is far preferred by the authors to total oil-quenching of complete wheels which can lead to the danger of them cracking even sometimes while in store. Spraying introduces a favourable system of residual stresses which are compressive in the rim; this is usually followed by tempering to obtain more accurate control of the wheel hardness.

The beneficial effects gained by the addition of alloying metals such as molybdenum, chromium, and aluminium are described and some of their disadvantages, including cost, are discussed; an alloy tyre suitable for one application is not necessarily always suitable for another. An important observation by the authors is that the presence of wheel and tyre manufacturers at discussions with users preceding the drawing up of a standard specification can prevent the introduction of requirements which tend to increase the cost of the product without always being strictly necessary.

Brazilian Railways in 1959

IN 1959 Rede Ferroviaria Federal S.A., the holding company, incorporated E. F. Central do Parana, now under construction from Ponta Grossa to Apucarana; E. F. Santa Catarina, and Viaçao Ferrea Rio Grande do Sul. Including these additions R.F.F.S.A. now controls 19 railways, with a combined length of 12,862 miles, or 70 per cent of the aggregate extension of the Brazilian railways. E.F. Central do Parana is not included in the total.

The R.F.F.S.A. report shows that between 1958 and 1959, in millions of units, passengers per km. increased 9·9 per cent, to 11,135, the increase amounting to 2·2 per cent for long distance, and 16·3 per cent for suburban passengers. Freight in millions of tons/km. increased 19·1 per cent, to 6,744·1 ; the overall traffic increase amounted to 12·1 per cent, as compared with 5·9 per cent between 1957-58. Freight carried in millions of tons/km. by Central Brazil Railway amounted to 3,189·9 ; E.F. Parana-Sta. Catarina, 986·3 ; Noroeste Railway, 564·1 ; Rede Mineira, 441·5 ; Santos-Jundiai, 431·0 ; Leopoldina, 370·4.

Forty additional diesel-electric locomotives were put into service during the year, reducing the proportion of steam traction on the incorporated railways to 20 per cent. Rolling stock was increased by 756 wagons, 98 passenger coaches and 30 electric railcars. In May compositions of 90 wagons, hauled by four or six diesel-electric locomotives of 1,600 h.p. according to the terrain, started carrying loads of 7,835 tons of ore between Lafaiete and Volta Redonda.

The number of staff employed by the incorporated railways was reduced by 1·95 per cent in 1959, to 137,647, including 15,366 taken over with V.F. Rio Grande do Sul. The number of employees per million tons/km. of freight was reduced from 24·8 to 20·4 per cent in 1959.

Capital plus reserves increased by 11·48 per cent last year, to 75,922,243 cruzeiros; operating receipts rose by 17·72 per cent, to 10,529 million cruzeiros, other receipts, by 13·20 per cent, to 1,255·5 million, making the total revenue 11,784·5 million. Expenditure increased by 29·20 per cent, to 23,616·8 million; 25·49 per cent of the increase was due to staff payments, 31·83 per cent to materials, largely because of cruzeiro depreciation, and 41·69 per cent to sundries. Staff payments rose, despite the decrease in numbers, because of increases imposed by law in minimum wages and in bonuses to public servants.

The report points out that the deficit of 13,087 million cruzeiros was covered by government subsidies and grants. Consequently, for each cruzeiros earned by the incorporated railways the Treasury contributed 1·20 crs. to cover the cost of the services. Moreover, the combined deficit of the incorporated railways was equivalent to 50 per cent of the total budget deficit of the Federal Union in 1959. To reduce future deficits, R.F.F.S.A. plans to close uneconomic lines wherever possible. The difficulty of balancing revenue and expenditure is aggravated by social legislation, which limits the possibilities of reducing staff and wages, while competition with road transport services rules out any adequate increase in railway tariffs.

The 130th Anniversary of First U.S.A. Railway

THIS year the Baltimore & Ohio Railroad, the pioneer railway in the United States, celebrates the 130th anniversary of the opening for public traffic of its initial 14 miles of line in 1830. This was in the vicinity of Baltimore and is still in service. On it are two stone-arch bridges carrying heavy double-line traffic today. The original track consisted of iron bars bolted down to stone blocks about 12 in. square laid on rubble spread along a shallow trench; the bars were subsequently replaced by rails obtained from England.

In 1960 the B. & O. RR. carries over 100,000,000 tons of freight annually, 65 per cent originating on the system. Mineral traffic accounts for that same percentage of the total, some 28 per cent consisting of manufactured and miscellaneous products. The route-mileage of the system is 5,917 and the track-mileage 11,525, including sidings. Its main routes are from Philadelphia through Baltimore and Washington to Cumberland, where they bifurcate, the northern one continuing via Pittsburgh to Chicago, with important branches (*a*) to Buffalo and Rochester, N.Y.; (*b*) to Cleveland, and (*c*) to Toledo and Detroit. The southern main line runs to Cincinnati and St. Louis, with branches to Indianapolis, Louisville, and Springfield. There are also numerous chord lines between the main routes mainly in Ohio, and directly connecting Cincinnati with Pittsburgh and with Toledo and Detroit.

Largely responsible for this large volume of traffic is the B. & O. wealth in ports. At Baltimore it has three large ocean terminals, Locust Point, Curtis Bay, and Hawkins Point. The former is claimed to be the largest railway-owned-and-worked port in America. The latter was constructed in 1959 only. At New York the B. & O. port facilities are in New Jersey, on Staten Island and in Manhattan, and at Philadelphia there are also large port facilities owned by the company. Moreover, it serves ports on three of the Great Lakes. At Toledo it has, jointly with the New York Central administration, great coal and iron-ore docks, and a somewhat smaller installation at Lorain.

Unfortunately, most of the Eastern seaboard traffic has to be hauled over long lengths of main line traversing mountainous country, notably between Cumberland and Pittsburgh on the Chicago line, and in West Virginia near Parkersburgh on the St. Louis route. Consequently, main-line gradients are as steep as 1 in 50 or even steeper, and curvature is as sharp as 8-ch. rad., and averages over considerable distances about 17 ch. Curves with 4½-ch. rad. are to be found on branch lines. Reduction of gradients and curvature is difficult in such rugged country, but some improvements have been made. Meanwhile freight-train speeds are limited to 50 m.p.h. on the mountain sections and 60 m.p.h. elsewhere.

To carry the traffic in such conditions about 30 per cent of the 7,330 miles of main-line track are laid with 140-lb. rails. Some 80 per cent of the new rails purchased in recent years are of this section, the remainder being of 115-lb. section. The excessive curvature causes rapid rail-wear and the rails are frequently transposed on the curves. Consequently, long-welded rails are not considered economical, but the rails on the sharper curves are being heat-treated experimentally. About a year ago it was announced that the administration had acquired virtually £1,000,000-worth of equipment for the mechanisation of track maintenance on a lease basis. The Civil Engineering Department has also recently been reorganised, the former Engineering & Construction and Maintenance Departments—each with its own Chief Engineer—being combined as a single department under Mr. C. R. Riley, Chief Engineer. He has under him Mr. C. E. Jackman, Assistant Chief Engineer, Maintenance, and Mr. E. F. Wright, Assistant Chief Engineer, Construction.

The maintenance labour force has also been completely

reorganised and mechanised. Sleeper renewals and surfacing are now done on a cycle basis with small gangs. Rail-laying is also carried out with a gang of about 24 men and full mechanisation. All timber used for sleepers, bridge and structural timbers is treated. The present rapid expansion of the highway system and elimination of level crossings is throwing a heavy additional burden on the Engineering Department. The programme includes 137 road overbridges and 46 underbridges, 32 of the former and 15 of the latter being already under construction. Even if the overbridges are designed and built by the highway authority, the designs have to be scrutinised, and the work jointly planned and supervised ; the railway's interests during construction have to be watched and costs have to be agreed. Furthermore, the 128 tunnels aggregating 23 miles in length, involve considerable maintenance, and certain of them are to be either entirely or partly daylighted or replaced by open cuttings. Over 300 miles of track are worked under C.T.C., and important extension of this control is being carried out. More than 1,400 level crossings have automatic protection, including about 200 with automatic short-arm gates.

American Railway Statistics

(*By a correspondent*)

THERE is no need to cross the Atlantic to find out what American railroads are doing. Their statistical apparatus renders an account of developments from week to week, month to month, and year to year. Freight traffic is what matters in the U.S.A., earning enough revenue to cover losses on passenger services. The Association of American Railroads issues a weekly statement of wagon loadings, which are the backbone of railroad business. On March 12, the *Wall Street Journal* could comment on rail forwardings for eight main groups of traffic to March 5. Anything of that kind is impossible in this country, though the first public railway was inaugurated in Britain in 1825.

About the 21st of each month the A.A.R. circulates a bulletin on the transport situation, explaining how far the railroads met the demands for wagons of various types. The paper states the number of wagons available for traffic at the first of the month, the number under repair, and the withdrawals from service, with particulars of new wagons installed and on order. Terse notes on traffic trends put the railroads wise about current happenings and help the 13 traders' advisory boards to join them in considering problems of wagon supply.

Next a feat of accountancy produces, with unfailing regularity, a monthly statement of railway revenues and expenses, for the U.S.A. railroad system, with results for 109 individual railroads. The return for December, 1959, bore the date February 12, and copies were in London early in March.

In April the A.A.R. circulates a set of operating statistics, cramming into nine large sheets details of train and yard service, locomotive fuel consumption, and motive power and wagon ownership for each railroad. The 1959 statistics are sure to reach London early in May. Later in the month there should come to hand a copy of " A Review of Railway Operations in 1959," written by Mr. J. Elmer Monroe, Vice-President, A.A.R., and Director, Bureau of Railway Economics. This annual survey of the railroad position discusses all its aspects in logical order and has become an American institution. A similar report on British Railways would be invaluable, if it were available by the middle of April each year.

In August the Bureau of Railway Economics includes further details in a statistical summary, giving comparative results for a period of 10 or more years. The 43rd summary, which came to hand on September 18, dealt with the years 1948–58. In addition to 14 comparative statements, it contained a unique sheet giving for the year 1958 the number of wagons and tons of freight originated by 340 commodities, besides the gross freight revenue accruing. This remarkable analysis sorted out 30 million wagons, 1,190 million tons of traffic, and $8,470 million of freight revenue.

The climax of the statistical sequence is reached when the Bureau of Railway Economics publishes at intervals a record of development since 1921, entitled *Railroad Transportation*. The last issue, in December, 1958, showed how the railroads were losing a large share of inter-city freight traffic to road, water, and oil pipeline competitors, while private motorcars and airlines were destroying railway passenger business. A hard fight for existence is in store for the railroads, but in defending themselves they will not suffer from the lack of traffic statistics.

Letters to the Editor

(*The Editor is not responsible for opinions of correspondents*)

The " Little North Western "

April 22

SIR,—In the paragraph " Serving Schools " in the Scrap Heap of April 22, there are a few points which require amplification and correction.

Primarily, the L.N.W.R. section of the Ingleton branch was not, of course, the " Little North Western ", although the first proposals for a railway through the Lune Valley did emanate from the North Western Railway, which was accorded the diminutive in order to distinguish it from its larger namesake, the London & North Western. The N.W.R., which later was absorbed by the Midland Railway, actually built the southern, Midland portion mentioned in the paragraph.

The special train, or rather trains, for Sedbergh School have run for many years. There are usually three passenger trains consisting of through carriages attached to main-line trains at the junctions, supplemented by parcels trains for the boys' luggage, and the special notices issued in connection with the working tend to suggest that Sedbergh School is the prior reason for running them. When the girls' school at Casterton assembles or breaks up on the same day, they share the train.

Yours faithfully,

MICHAEL N. BLAND

29, Maryfell, Sedbergh, Yorks.

[The Low Gill to Ingleton branch is sometimes referred to as the " Little North Western."—ED., *R.G.*]

Passenger Train Speed

April 23

SIR,—Your review on April 22 of Western Region summer timetables stated that the fastest schedule on our railways will be that of the 1.50 p.m. from Bristol to Paddington over 41 miles from Swindon to Reading in 36 min., a speed of 68·8 m.p.h. That does not say much for progress on British Railways.

From 1935 to the outbreak of war, the " Silver Jubilee " of the L.N.E.R. covered long stretches of line at over 70 m.p.h. on its 4-hr. journey of 268 miles from Newcastle to Kings Cross, with a stop at Darlington. An important point was that it made the up run between 10 a.m. and 2 p.m. and returned at the same speed in the evening, to the satisfaction of North Eastern business men. Another of the L.N.E.R. high-speed trains, put into service later, ran 120 miles from Kings Cross to Newark in 100 min. and then carried on into the far beyond. These trains, designed by Sir Nigel Gresley, with locomotives of the *Silver Link* type, met the needs of the commercial world and ordinary train services did not suffer from their introduction.

Last year the Western Region reduced coaching train-miles by 3·3 per cent, while other Regions increased train mileage. The Eastern, for example, added 183,000 train-miles, or 0·5 per cent, to its programme. The Western was also alone in slowing down coaching steam speed to 14·65 m.p.h. The North Eastern set the pace at 18 m.p.h. and the Scottish Region, despite its banks and braes, recorded 15·6 m.p.h.

The all-line coaching diesel train speed was 17·8 m.p.h. last year. The Western Region was the slowest mover at 15·8 m.p.h. The Southern led with 23·6, followed by the North Eastern with 21.4, the Eastern and London Midland with over 17, and Scotland with 16·4 m.p.h. It is not surprising that the Western Region lost 2,241,000 passengers, or 2·2 per cent, last year.

Yours faithfully,

R. BELL

Clacton-on-Sea

THE SCRAP HEAP

Schoolboys at Doncaster Works

The Doncaster Locomotive Works of British Railways, Eastern Region, has attracted many hundreds of schoolboys during the Easter holidays. Five special trains from southern England and the Midlands were arranged to carry 2,500 boys; the last was run on April 26. The boys were shown the works in action, including the shop where multiple-unit electric stock for the Liverpool Street to Hertford East line is being built. In the foundry they saw the casting of parts for steam locomotives.

Swindon's Debt to the G.W.R.

Swindon is where one might expect to find train spotters in fullest force and, in fact, its station platforms have been crowded with enthusiastic youngsters all this week in the sunny leisure of their Easter holiday. Railways—locomotives, carriages, and wagons—are in the blood of Swindon youth, and in the speech of their fathers it is still the Great Western. Nor could it be otherwise. Everything on the credit side of our nationalised railways in respect of working conditions and social welfare, one will be assured by any Swindon man, was inspired by the Great Western. When this borough itself became the first in Britain to have a municipally owned arts centre what, in fact, was it doing but taking over for the public benefit a wide range of cultural activities that had been built up across the years by the Great Western ? That was in 1947. Perhaps the distinction between railwaymen in general and men of the old Great Western has disappeared by now, but certainly this railway town has not ceased to be in the forefront of boroughs whose councils take care ot give the ratepayers every reasonable opportunity to enjoy the arts. . . . For its part Swindon has a population keen enough on art to make it well worth while having at its central library early this month a Toulouse-Lautrec exhibition arranged by the Arts Council of Great Britain. . . . A locomotive engine proper is but one detail in the Swindon coat of arms granted to this borough just on 60 years ago.—*From "The Times."*

Trainspotter Trouble

Stationmaster Joe Walsh of Doncaster Central assembled his shattered staff to decide what to do with 1,600 young trainspotters. He said: "We must act now before we all go potty." The spotters, he said, are threatening to disrupt train services, besides turning his hardened railmen into nervous wrecks. "Sooner or later," he added, "they are going to crack." Some of the hundreds of youngsters who go to Doncaster to write down engine numbers behave like "wild animals." They push trolleys around, often on to the line; knock passengers about as they rush from one platform to another; run across the lines in front of 70-mile-an-hour expresses. Some, said Mr. Walsh, even hang like monkeys from footbridges. How to get tough? Suggestion: Pen the spotters in a wire cage. . . . Suggestion from 65-year-old Station Foreman Percy Leeson: "After all these years I have a perfect remedy—a good old-fashioned clip around the earhole." Today's memo to the trainspotters: Watch out, Foreman Leeson might be around.—*From the "Daily Express."*

"The Royal Scot" Inn, Carlisle

Carlisle, the gateway to Scotland and an important railway centre on the West Coast route of the "Royal Scot" between Euston and Glasgow Central, is the only place in Great Britain where the public houses are operated by the Government. An inn recently opened there, "The Royal Scot," commemorates the express of that name, introduced by the London Midland & Scottish Railway in 1927. The sign, contributed jointly by the Home Office and the London Midland Region of British Railways, depicts the train, hauled by a *Coronation* class 4-6-2 locomotive, at speed in the fells south of Carlisle. On a wall by the entrance is a headboard, as borne by the locomotives hauling the train. In the lounge bar is a model of the 4-6-0 locomotive, *Royal Scot*, in its L.M.S.R. livery, with the headlight and bell which were fitted when this engine and one of the "Royal Scot" train sets made a tour of the U.S.A. and Canada in 1933, and was exhibited at the World's Fair, Chicago. The locomotive was built by the North British Locomotive Co. Ltd., in 1927, to the design of Sir Henry Fowler, Chief Mechanical Engineer of the L.M.S.R.

Marine Experience

When the New Zealand Railways Department takes over the control of the Cook Strait rail-road ferry, at present being designed, it will not be a new experience as for a good many years now the department has operated a steam yacht, the *Earnslaw*, on Lake Wakatipu, the Southern tourist resort. At one time the department ran two vessels on the lake, but the older of the two steamers was sold as a houseboat some years ago. The department is continuing with the *Earnslaw*, despite an annual loss of £5,828, realising its facility for tourist trade and servicing small settlements on the shores of the lake.

Railway Skyline

As an East Grinstead to London commuter, my sympathies are heavily in favour of electrification of the London-East Grinstead-Brighton line. But . . . British Railways has other, more honourable uses for unprofitable lengths of the permanent way. The section between East Grinstead and Horsted Keynes, now closed, boasts long stretches where lines of countless condemned goods wagons, like old soldiers, are fading away. Their inspiring silhouettes festooning the skyline may be observed from some distance in many places. I assume they are also intended to add to the charm and character of the Sussex countryside.—*From a letter to "The Daily Telegaph."*

"The Royal Scot" Inn, Carlisle, with (right) engine headboard

Sign depicting the express in the Fells

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

EAST AFRICA

Mombasa Deep Water Berths

Progress on the new deep water berths Nos. 11 and 12 at Kipevu, due to come into operation by the end of the year, includes the construction of a 500-ft. by 200-ft. single-storey transit shed on No. 12 which will be handed over this month to the East African Railways & Harbours by the contractors, Christiani & Neilson, J. L. Keir & Co. Ltd. The shed is of three-span construction with columns built *in situ* and trusses pre-cast on the site. The wharf apron will carry three metre-gauge rail tracks of dock tramway section, the first used in East Africa, and twin 15-ft. crane tracks, all sunk flush with the deck. Dock rail will also be used at the rear of the shed.

On berth 11 a light steel shed 433 ft. by 140 ft. is being constructed by H. Young & Co. Ltd. This shed is a first stage measure; later it may be replaced by a double-storey shed. At the back of berths 11 and 12 a seven-track wagon sorting grid is being laid. Along the toe of Kipevu hill a heavier track is being laid over which boat trains will run, leaving the main Nairobi–Mombasa line at Changamwe and reaching the passenger reception hall at Kilindini *via* the bridge-causeway joining Kipevu with the island. This track will be opened in mid-July and subsequently boat trains will no longer use Makupa Causeway.

SOUTH AFRICA

Change in Owners' Risk

It has been decided to change the condition of carriage known as owners' risk. The Railway Administration following on the change will accept liability in the case of the complete loss of a consignment or the loss of a whole package forming part of the consignment, or for pilferage and delay in instances where the traffic was checked by a servant of the Administration at the time of acceptance and was consigned from a station to a station. The Railway Administration will be exempt from liability upon proof by it that the non-delivery, pilferage, or delay was not caused by the negligence or misconduct of the Administration or its servants. The risk conditions under which goods are accepted for transport will be governed by the observance or non-observance of a standard packing code. The question of packing specifications is at present being considered.

Express Goods Service

The South African Railways will introduce an express goods service between Johannesburg and Durban in both directions on July 4, 1960, and at the same time this service together with the other express services already operating between Cape Town, Port Elizabeth, East London, and Johannesburg will be extended to include Pretoria.

Express goods traffic receives priority and is conveyed by fast goods trains, but the most important advantage to commerce and industry of the express goods services is the guaranteed delivery by the Railways within a specified time. In the case of the new Pretoria—Johannesburg—Durban service the Railways will undertake to deliver goods railed from Johannesburg and Durban on the second day after acceptance. The delivery period for traffic to and from suburban stations on the Reef, including Pretoria, and in the Durban area will be one and two days more than between Johannesburg and Durban, for example, goods between Pretoria and Durban will be delivered on the third day after acceptance and between Pretoria and Umgeni the guaranteed delivery date will be the fourth day after acceptance.

INDIA

Barauni—Samastipur Construction

With the bringing into service of the Mokameh Ganges Bridge, Barauni became the 5-ft. 6-in. gauge railhead with transhipment facilities to and from the N.E.R. metre-gauge main line. As Samastipur an important junction and traffic centre is only 33 miles north-west of Barauni, it was natural that the broad-guage line should be extended to that point, and the construction of this extension has now been sanctioned by the Railway Board.

Soil Mechanics

The Railway Minister inaugurated the first Asian Regional Conference of the International Society of Soil Mechanics and Foundation Engineering held in Delhi on February 4. The conference was attended by engineers from a number of Asian countries and representatives of State and other engineering organisations. The Minister said that research work in soil mechanics in India was being carried out by the Ministries of Irrigation, Education, Transport and Railways. One of the speakers recommended that each of the 34 national committees in the Asian Region should maintain one or more permanent centres for tests and training in soil mechanics, and for exchange of scientific data.

WESTERN AUSTRALIA

Development of Industrial Sites

The Commissioner of Railways, Mr. C. G. C. Wayne, has stated that plans are being prepared in conjunction with the Town Planning Commissioner and the Department of Industrial Development, for the development of industrial sites near the railway system. The proposed sites would have the merits of cheapness, low rating, accessibility to rail routes, lighting power, water supplies, and adequate labour. The layout of factories and power plants would preserve local amenities.

Railway land temporarily unused is available for leasing, and in many cases is particularly well suited by its position and accessibility to other services for industrial purposes. Mr. Wayne stated that there was practically no limit to the information his Department could give traders on any aspect of proposed development. This information would be in the mutual interest of traders and the railway system.

VICTORIA

Standard Gauge Progress

Ballast for the standard-gauge line between Melbourne and Albury has been laid for about 11 miles between Glenrowan and Wodonga. Between Wangaratta and Bowser about two miles of track work has been assembled ready for ballast tamping, and rails and sleepers are in position for work to go ahead on a further 1½ miles of track in this section. Nearly all of the steel required for the standard-gauge line bridges has been delivered from New South Wales and has been either placed in position on the bridges or stockpiled at Bandiord, near Wodonga. Earthworks have been completed between Avenel and Winton (55 miles) and between Glenrowan and Wodonga (51 miles) and earth and bridge works between Broadmeadows and Avenel are well advanced. The first of two retaining walls for the flyover between Jacana and Broadmeadows is completed and earthworks are in hand for the first stage of track work alterations. The flyover will enable standard-gauge trains to cross over from the east side of the existing 5-ft. 3-in. tracks and be routed through Albion on their way to the Dynon terminal without interference to suburban traffic on the Broadmeadows line.

BRAZIL

Proposed Mineral Railway

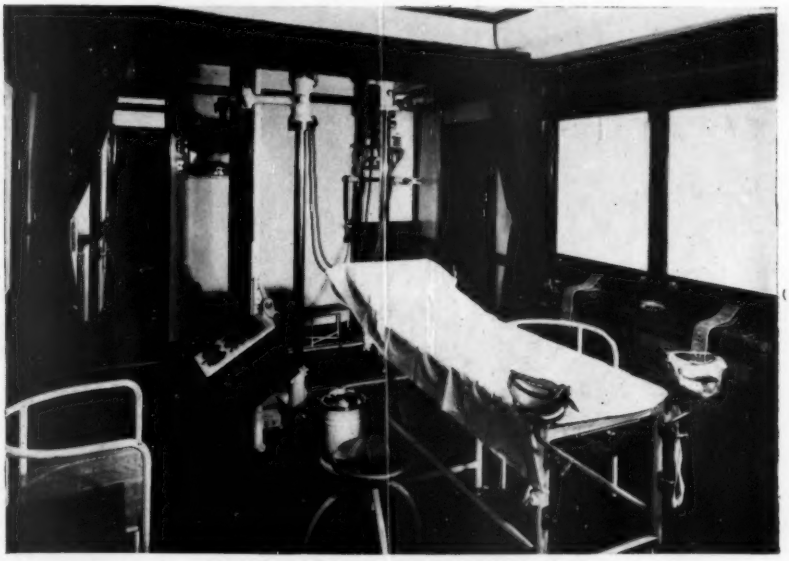
Representatives of the M. A. Hanna Company, of Cleveland, which, in association with Leo Model, of New York, has acquired the controlling interest in St. Joao del Rei, Minas Gerais, for the purpose of exploiting valuable iron-ore deposits, are studying the possibilities of building a railway to connect the Valley of Rio das Velhas to the Bay of Sepetiba, near Rio de Janeiro. The project includes the former plans for building a shipping port at Itacurussa, the terminus of the new railroad, to relieve the pressure on the Central Brazil Railway and the port of Rio. The overall cost is estimated at U.S. $300,000,000.

SPAIN

R.E.N.F.E. Medical Centres

Two new medical centres have been opened in Barcelona and Bilbao by the National Railways for the practice of

preventive medicine for serving employees, their relatives, and retired personnel. This is a further stage in the development of the preventive medicine plan started with the operation of the Madrid Central Dispensary and supplemented by mobile medical centres. These mobile centres are rail coaches fitted with a waiting room, consultation room, X-ray apparatus, laboratory, study department, and accommodation for medical staff.



Spanish National Railways mobile medical centre, showing X-ray apparatus

SWITZERLAND

South-North Oil Pipeline

The Swiss Federal and the Lötschberg Railways may be affected considerably if proposals for an oil pipeline through Switzerland from Italy to Germany are carried out. Two alternative routes are proposed. The first is over the Great St. Bernard pass to Martigny, down the Rhone valley to Aigle, then over the Col des Mosses to Chateau d'Oex and Saanen and by Saanenmöser to Zweisimmen in the Simmental, from which the pipeline would continue to Thun and through the Cantons of Berne and Aargau to the German frontier. The alternative route would be from Bellinzona over the San Bernardino pass into the upper Rhine valley and so past Chur to the eastern end of Lake Constance and into Western Germany.

The promoters plan that where railways are in existence along their routes, which is for a considerable proportion of the distance, the pipeline should be laid along the railway right-of-way. The railways contend that this is impracticable, seeing that 15 m. (49 ft.) of width, half on each side of the line, would be needed to provide adequate space and that this would be impossible to provide, especially in the vicinity of stations. The railways also would stand to lose a considerable amount of oil traffic if the pipeline were built. A committee has been formed, with representatives of the Federal Government, the railways, and other interests affected, to study the proposals.

NORWAY

Prototype Underground Stock

A/S Strommens Verksted has completed two prototype motor coaches for the future Oslo municipal rapid-transit system, to be created by building a cross-city underground link between the Kolsas, Holmenkollen, Lilleaker and Lambertseter suburban electric lines. Although of standard gauge, the system will retain the generous loading gauge of the Kolsas and Holmenkollen lines, and the prototype cars have been built to these dimensions; the spacious interior offers standing room for some 150 passengers in addition to seating for 66 passengers.

Each car is powered by four 92 kW. motors, and has a half-width driving cab at each end. Between 80 and 100 cars will be necessary for the new system. The livery of the prototype vehicles is light grey with a blue waistband. Test runs are to be carried out between Majorstuen, Avløs and Kolsås on the eastern group of suburban light railways.

Publications Received

G.E.C. Export Guide.—The April issue of the guide analyses prospects for British exports in 34 major overseas markets and for 36 product groups. The outlook for the second quarter of 1960 is good in 22 countries, improving in four, deteriorating in five, and unchanged in three. Details are given of proposed railway developments in Australia, Norway, and Portugal offering opportunities for British exporters. The guide may be obtained, free of charge, on application to the Economic & Marketing Research Unit, The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

World Railway Insulation by Onazote.—The versatility of Onazote as an insulating material is shown in this multi-lingual booklet issued by the Expanded Rubber Co. Ltd. Illustrations include chilled meat wagons for Africa, refrigerated fruit cars for America, and a frozen food container for Australia. There is also an illustration of a British Railways meat container undergoing repairs to the interior panelling and showing how the Onazote remains in perfect condition after 20 years' service. Onazote is an expanded ebonite with a non-intercommunicating cellular structure which absorbs only 1·5 per cent of water by volume after six weeks' total immersion. Further examples show how it is suitable for use in territories where rainfall and extremes of heat and cold bring special problems. The resistance offered by Onazote to most deteriorating factors makes it an efficient means of insulation for wagons and containers, coaches, restaurant and sleeping cars, and drivers' cabs. The booklet is printed in 14 languages including Russian, Chinese, and Serbo-Croat. Copies may be obtained from the Expanded Rubber Co. Ltd., Mitcham Road, Croydon, Surrey.

The Allen West Story.—This 64-page book has been published to mark the Golden Jubilee of Allen West & Co. Ltd. in the manufacture and development of electric motor control gear. It is well produced with many interesting half-tone and line illustrations, and gives a brief impersonal account of the progress and achievements of the company during the past 50 years. The book has been published for private circulation by the company.

An Historical Geography of the Railways of the British Isles. By Ernest F. Carter. London: Cassell & Co. Ltd., 35, Red Lion Square, W.C.1. 10 in. × 6¼ in. 637 pp. Price 63s.—The avowed purpose of this work is to set out in chronological order the main factual and statistical details of the development of the many railways which have composed the systems of Great Britain and Ireland. There are no illustrations and the book is described as a reference work, not intended for consecutive reading. It fails in its object because of the numerous errors, omissions, mis-statements, and contradictions. Most of the information seems to have been derived from secondary sources, and to have perpetuated their inaccuracies and inconsistencies. For example, the Liverpool & Manchester Railway was not opened on September 30, 1834, and passenger traffic figures given elsewhere show that the author could have been aware of this.

The British Transport Staff College at Woking

Sixteen-week course for future managers is designed to increase confidence and develop character

Exterior view of the back of the College

THE British Transport Staff College at Woking was opened in August, 1959, to provide training in higher management for all branches of the British Transport Commission.

The College method lays stress on what may be termed mutual and self-instruction through the media of free discussion in syndicate, over and above the help given by visiting speakers, recommended private reading, and external visits.

The average age of the present course is 42. From the moment of entrance, every effort is made to create a "club" atmosphere—Christian names are used and, whatever his professional grade, every member ranks equally with all other members of his course.

Wide Range of Membership

Members are drawn, on the recommendation of General Managers, from all branches of the Commission, including the London Transport Executive and controlled companies, and from a wide salary range. The first course included Assistant Officers from Regional offices and from B.T.C. Headquarters, a Works Manager, a Commercial Officer, a Senior Scientific Officer, a Divisional Traffic Officer, and several District Officers.

Although the course is residential, members can return to their homes at weekends.

The course is divided into four sessions covering respectively: I—Principles of Business Organisation; II—the Economic Background and the Market for Transport; III—Human and Industrial Relations; and IV—Some Current Problems of the British Transport Commission.

In the first session an exercise compares the organisation of the British Transport Commission with that of other nationalised industries and privately-owned undertakings. Lectures deal with the basic principles of organisation, the organisation of other nationalised industries, the statutory and non-statutory parts of the Commission's organisation, and with Unilever Limited.

Another exercise deals with figures as a tool of management. Lectures deal with statutory requirements, the scope of budgetary and statistical controls, costing, trading returns, and the relationship of finance and management. Visits to headquarters offices and depots instil an understanding of the bases on which accounts and statistics are made available at different administrative levels.

The session includes a study of public relations within the Commission's undertaking, and pays particular attention to the customer's point of view. A short practical exercise studies methods of keeping passengers informed of variations in and interruptions to services, including those used at railway stations and at London Airport.

Economic Background and Markets

The second session is devoted to the economic background and the market for transport, and includes four exercises. The first of these includes lectures on the national economic outlook, the market for public and private transport, the position of the road haulier and of the "C" licensee, and the co-ordination of public transport undertakings.

The second exercise covers techniques for stimulating traffic, and includes lectures on methods of finding out what the customer wants, passenger fares structure, railway freight services, the Freight Charges Scheme, and the scope of publicity in traffic development. Visits are made to various projects designed to stimulate traffic, and to market research consultants.

The third exercise covers the future of the coal and steel industries. Lectures are given on national fuel policy, the future of the steel industry, and the long-term markets for coal. Visits include a steel works. The fourth exercise studies the consumer consultative machinery in transport.

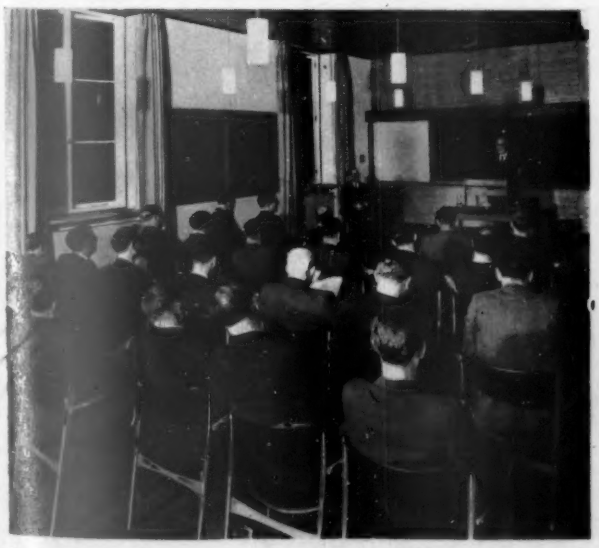
Human Relations

The third session includes exercises on transport industrial relations, on morale in the transport industry, and productivity techniques.

In the first exercise, members attend lectures on current British industrial relations, the organisation of the transport trade unions, and the negotiating machinery of the transport industry.

The second exercise includes lectures on recruitment and promotion principles, training and education, welfare and discipline, and joint consultation.

The study of productivity deals particularly with the impact of improved techniques on human relations. Lectures cover the scope of operational research, computer techniques, organisation and methods, and work study. Particular attention is focused on the role of the consultant in improving productivity.



Inside the College. (Top left): lounge. (Top right): sun lounge. (Centre left): dining-room. (Centre right): billiards room. (Bottom row): lecture room. (Left): Sir John Benstead, Deputy Chairman, B.T.C., addressing the First Course. (Right): a conference

Work in a syndicate room

A short contrasting practical exercise studies the problems of freight handling in international services, and includes a brief visit to the Continent.

Current Problems of the B.T.C.

The fourth session comprises four exercises. The first constitutes a study of the British Railways Modernisation Plan, and its effect upon the financial position of the Commission. Lectures cover electrification, diesel traction, methods of freight handling, civil engineering aspects, and the financial side of the revised plan.

The second exercise studies the problems of adaptation to technical change. Lectures cover the field of research within and without the Commission's undertaking, electronics, the scope and limitations of employing contractors and consultants, and design.

The third exercise is a case study in which a number of the subjects previously studied are brought together in a practical exercise.

The last exercise deals with the potentialities of estate development within the Commission's organisation. Visits are paid to sites where important schemes are proposed or are in course of development.

The staff of the College comprises a Principal, a Director of Studies, four Assistant Directors of Studies, and a Bursar and Librarian. Direct tuition is not a main function of the Directing Staff, which is chiefly concerned with planning and supervising the courses. The method of working is as follows:—

Seven-Men Syndicates

Each course of 28 members is divided into four syndicates of seven. In each syndicate, for each exercise, the College appoints a Chairman and a Secretary. As far as possible those having expert knowledge are not appointed to the Chair in their own subjects, to avoid the risk of domination of a group by an expert.

The duties of the Chairman and Secretary respectively are to direct the activities of each syndicate and, for certain subjects, to produce written reports of its findings. Reports must not exceed 2,000 words. These offices encourage the development of efficient organisation and delegation, self-condence—particularly with regard to public speaking—and the ability to marshal facts in clear and concise form.

As new chairmen and secretaries are appointed for each exercise, every member serves at least twice in each office during a course.

Syndicate Rooms

Although formal meetings — lectures and conferences—are held in the Lecture Room, each syndicate works in its own small study. Here, members sit at ease round a table, and each Chairman directs the discussion from which his Secretary will subsequently make his report.

An Assistant Director of Studies is assigned to each syndicate and normally sits in at their meetings. He is thus able to keep a close watch on the progress both of the group as a whole and of every member in the group, and unobtrusively to restore discussion to the right lines when such action is necessary.

Many speakers, after lecturing, visit syndicates for further questions and discussion.

Considerable attention is given by the College to the provision and recommendation of reading matter. Time is allowed in the programme for the private reading needed if the course is to be satisfactorily followed.

Relaxation

Despite the exacting nature of the course, time is found for relaxation in the beautiful grounds in which the College stands, the comfortable lounge fitted with a bar and furnished with easy chairs, in the large recreation room with its full-size billiards table and in its quiet sun-lounge.

An important aspect of all the accommodation is the quiet harmony of its decorations and furnishings. Muted colour contrasts provide exceptional eye appeal and an atmosphere conducive to study. There is not one jarring note, from the white paint kept spotless by an extremely capable domestic staff most efficiently supervised by the House Superintendent, Mrs. S. West, to the dull-green table glass which repeats the colour of the Swedish shades for the ceiling lights. Furnishings incorporate the best of modern British and Scandinavian ideas on interior decoration.

In addition to the rooms already referred to are the Library, individual bedrooms for members of the course—each with hot and cold running water, divan with fitted bookcase, wardrobe, and writing table—dining-room, staff accommodation, and modern kitchens.

On the opposite page are reproduced photographs of the College staff with some biographical details.

Course members at work in the library

Mr. Harold E. Cardy, Assistant Director of Studies (*left*). Cambridge graduate and Chartered Secretary; joined L.N.E.R. in 1937 as Accountancy Apprentice, trained in departmental offices of the Chief Accountant at Hull, York, and Kings Cross; war service—R.E.(Tn.) in France, North Africa, and Italy (attained rank of Major); 1946, L.N.E.R.; 1948, Assistant under Director of Costs & Statistics, B.T.C.; 1949, Senior Secretarial Assistant, Docks & Inland Waterways; 1952, attended Admin. Staff College, Henley; 1955, Asst. (Works & Land), British Waterways.

Mr. John Coulthard, Assistant Director of Studies (*left*). Educated Workington Grammar School and Manchester University, where he graduated B.A. with honours in Modern History with Economics and Politics. 1951, Traffic Apprentice, London Midland Region, British Railways; 1954, Goods Agent, Workington; 1957, Assistant in Manchester Sub-Office, B.T.C. Traffic Costing Service; 1958, returned to London Midland Region as Assistant to District Goods Manager, Bolton. Mr. Coulthard is an Associate Member of the Institute of Transport.

Mr. Dennis Cook, Assistant Director of Studies (*left*). Educated Northgate Grammar School, Ipswich; London and Cambridge Universities. First class honours degree, Part II, Modern Languages Tripos; Scholar of Queen's College. War service—R.A.F. Sqdn. Intelligence Officer, Fighter Command and 2nd T.A.F., F/Lt. Missing Research & Enquiry Service; 1950-56, L.T.E., P.A. to Chief P.R.O., P.A. to Chairman; 1956, attended Admin. Staff College, Henley; trained in all operating grades, Central Road Services, L.T.E.; Chief Depot Inspector, Thornton Heath and Rye Lane.

Mr. J. F. Rogers, Assistant Director of Studies (*left*). Educated Felsted School and Clare College, Cambridge. War service—infantry officer; 1946–48, Divisional Superintendent's Office, Woking, and Southampton, Southern Railway. 1948–51, special training in all departments of the Southern Region; 1951, Waterloo; 1952, Head of Section (Rules & Regulations & Works), D.T.S.O., Woking; 1953, Waterloo; 1956, Head of Section (Rules & Regulations), ICh. Optg. Sup. Office, Waterloo; 1957, Assistant to London (Western) District Traffic Superintendent.

Mr. M. R. Bonavia, Director of Studies (*left*). Educated St. Paul's School and Corpus Christi College, Cambridge University. 1945–53, Public Liaison Assistant to Chief General Manager, L.N.E.R.; Post-War Development Liaison Officer; Assistant Secretary (Development & Works), B.T.C.—later redesignated Principal Works & Development Officer — seconded to Gold Coast Government for three months to study economics of Gold Coast transport; 1953, Principal Officer (New Works), Railway Executive; 1956, Principal Officer (Modernisation) in General Manager's Office, Eastern Region, British Railways. Author, *The Economics of Transport*. In recent years, an examiner in transport economics in the University of London.

Major-General W. D. A. Williams, Principal (*above*). General Williams was educated at Brighton College, the Royal Military Academy, and Emmanuel College, Cambridge, where he graduated with a First Class Honours Mechanical Sciences Tripos and where he was a Scholar. He was commissioned in the Royal Engineers in 1917 and, in 1932–33, graduated from the Staff College in Camberley. From 1928 to 1938 he served mainly with the Works Services —he was responsible for the supervision of three major construction schemes, including the Royal College of Military Science, and he has worked in close conjunction with the Campbell Gas Engine Co. Ltd., Metropolitan Vickers Co. Ltd. and Messrs. Kennedy & Donkin. Immediately before the last war, he was employed on the preparation of the plan for the despatch and maintenance of the original expeditionary force to France. On the outbreak of war in 1939, he was placed in charge of the organisation responsible for all freight movements in the British Army. In 1943, he became Director of this organisation with the rank of Acting Major-General. In 1946 he was appointed Director of Movements, War Office, as substantive Major-General. He held this appointment until his retirement from military service in 1949. From 1949 to 1954, General Williams was Chief of the Port Emergency Planning Staff in the Ministry of Transport & Civil Aviation. In January, 1954, he was appointed Commissioner for Transport in the East Africa High Commission. Because he was at that time engaged on important work with the Ministry of Transport & Civil Aviation, he did not take up his duties in East Africa until April of that year. He was appointed the first Principal of the Staff College in August last year.

Miss P. M. Rumbold, M.B.E., Bursar & Librarian (*right*). Educated at private schools in London. 1934–47, Civil Service—Department of Inland Revenue; Board of Trade, Ministry of Shipping, and Ministry of War Transport. 1947, Private Secretary to Chairman, British Transport Commission, 1958, Organisation & Methods Section, B.T.C.

Economical Pre-stressed Concrete Bridge

Pre-stressed hollow pile and cellular deck structure built under intensive traffic

Left-hand crane removing old timber superstructure after the placing of new stringer by right-hand crane

THE Western Pacific Railroad recently replaced a timber trestle bridge over the Mormon Slough with a concrete structure consisting of four spans each of 25 ft. As this bridge is situated at the throat of a busy yard at Stockton, California, where there are "extremely heavy traffic movements," construction under such traffic was not easy. It was a good site totry out a new type of structure, though not subjected to fast traffic.

Factors Affecting Design

The length of span was dictated by having to avoid the trestles carrying the old 15-ft. spans. Also, in compliance with the administration policy to improve the designs of reconstructed bridges by providing ballast decks and to make them fireproof, it was decided to make this an all-concrete structure. The fireproofing was particularly necessary because large numbers of foot-passengers and others pass under it.

Choice of Materials

Estimates of construction and maintenance costs based on past experience of various types of bridge, and in particular of pre-stressed as opposed to pre-cast concrete or steel, showed pre-stressing to be considerably the most economical. Steel would cost more in material as well as more in maintenance than either of the types of concrete structure. Previous experience and design economy dictated a final decision in favour of pre-stressed concrete.

To carry out the operations under traffic, each of the three new piers was built of three pre-stressed concrete hollow piles so that they could be driven beside and between the old timber girders. Such piles had to be designed not only to carry heavy axial loads but also lateral pressures imposing bending stresses in the piles. This finally clinched the decision to use pre-stressing, creating a permanent compression of 700 lb. per sq. in., which was sufficient to eliminate tensile forces in the concrete caused by bending in the pile.

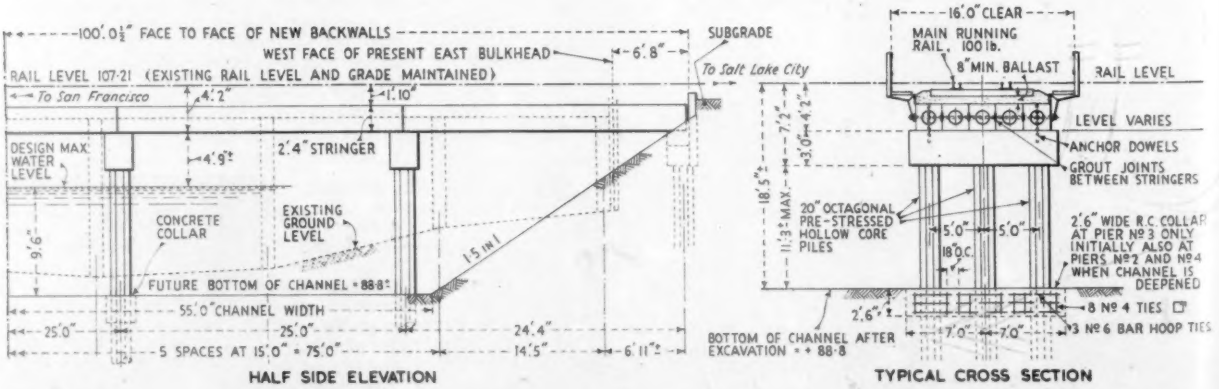
Pre-stressed Light Hollow Piles

Because of the ability of the pre-stressed pile to carry larger bending loads than comparable simple pre-cast piles, a member of smaller section could be used than would otherwise have been necessary, and so a 1-ft. 8-in. octagonal hollow pile was designed, securing considerable saving in weight. Incidentally, this simplified driving and made it possible to use railway equipment already in hand. In each bent the piles are spaced at 5-ft. centres. Other important advantages of pre-stressed piling are a reduction in tendency to cracking and spalling, and the fact that the piles can be driven in much harder ground.

For the deck also pre-stressing enabled considerably shallower and lighter stringers to be used, thus reducing construction depth. The stringers are, in fact, also hollow, being 2 ft. 4 in. square units with circular hollows 1 ft. 4 in. in dia. Five of them are placed side by side and clamped together with tie-rods. They have shallow recesses in their inner faces providing hollows between them subsequently grouted, and with the rods forming a homogeneous deck slab. The outer stringers are secured to the capping girders with anchor dowels. The capping girders are 3 ft. deep and are cast *in situ* across the tops of the three-pile bents.

Steel footways are cantilevered out from the deck at sleeper-level on steel brackets and have steel handrails. Deep continuous longitudinal angles behind

(*Continued on page* 512)

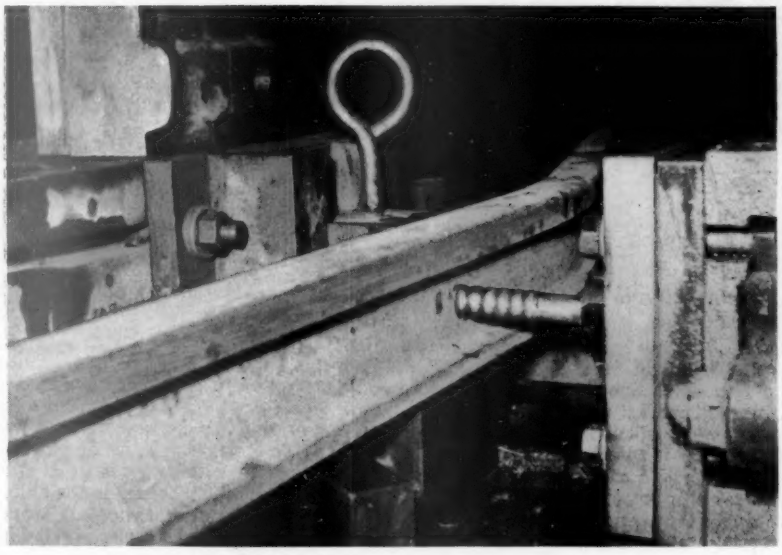


Half-side elevation and cross-section of bridge at entrance to yard at Stockton, Western Pacific Railroad, showing arrangement of pre-stressed concrete piles

Work-Hardening Bolt Holes in Rail Ends

A method of countering star cracking aggravated by high shear stress in rail fishbolt holes

By S. Wise, M.I. Mech.E., A.I.M.



Work-hardening process in operation on wing rail

ALTHOUGH relatively few rail failures occur on British Railways, it has been the custom for several years now to prepare detailed statistics on those failures which do occur. This analysis of rail failures has shown that the most frequently occurring type of failure is that classified as "4d" which takes the form of radial cracking from one or both boltholes known as star cracking as shown in the illustration overleaf. The cracks follow a path at 45 deg. to the axis of the rail; there are usually two from a hole but quite often four are found, spaced at roughly 90 deg. from each other. These cracks are potentially dangerous if allowed to grow undetected, because if the two upper cracks run into the head of the rail complete separation of part of the running surface about 8 in. long may occur.

High Stress Concentration

The Research Department of British Railways has paid very considerable attention to this form of failure. Analysis of the stress system in the rail shows that the cracks are due to high shear stress in the web aggravated by the presence of the fishbolt hole which introduces a stress concentration factor of four at the surface of the hole.

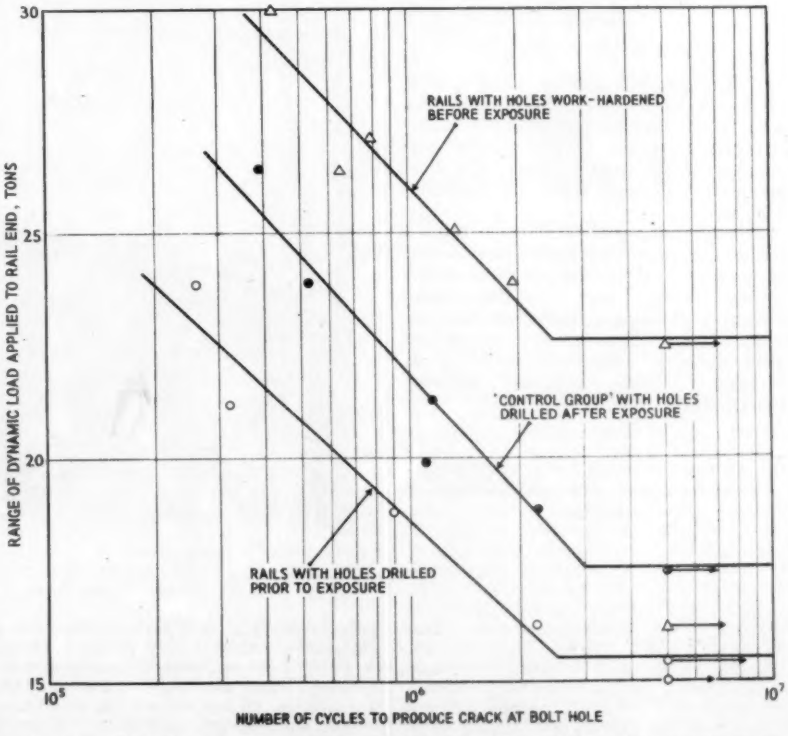
The use of short-gauge-length electrical-resistance strain gauges has made it possible to measure stresses at the bolt holes in rails in the track during the passage of trains. Many thousands of such measurements have now been made on different sites and under a variety of different forms of traction, and much useful information has been obtained.

There is evidence to suggest that increased stresses are induced in the bolt holes by the passage of locomotives with relatively small driving wheels, so that any method of increasing the ability of rails to resist star cracking becomes a matter of considerable importance.

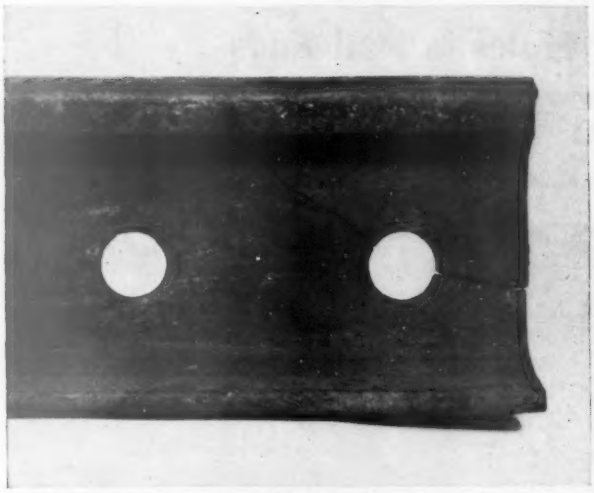
Fatigue Tests

While the field stress measurements have been in progress, fatigue testing of sample rails drilled with fishbolt holes has been carried out in the laboratory; more than 100 such tests have been made. The star cracking type of failure has been reproduced in the fatigue testing machine and the fatigue strength of the drilled rail in the new and corroded state established. Various methods of improving the fatigue strength of drilled rails have been tested; these have included improving the surface finish of the hole, reduction in hole diameter (as practised by the French National Railways), and the use of a thicker web f.b. rail. The greatest improvement has been obtained by work-hardening the surface of the holes, by initially drilling undersize followed by broaching or drifting with a spherical tool to the required size.

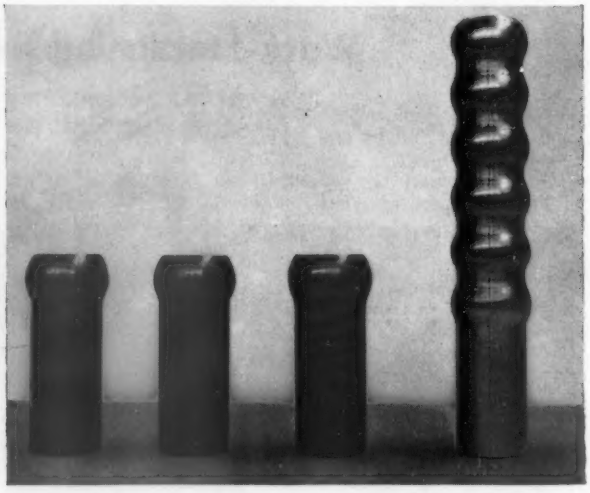
So far the initial reduction in hole diameter has been $\frac{3}{64}$ in. (from $1\frac{3}{16}$ in. to $1\frac{9}{64}$ in.) for 109 lb. per yd. f.b. rail; the work hardening has been done in a press using tools of the type illustrated, and has resulted in increasing the fatigue



Results of fatigue tests on 109-lb. f.b. rails after 12 months' exposure to corrosion in industrial atmosphere



Radial cracks forming a Class "4d" failure in f.b. rail



Tools of the type used for work-hardening fishbolt holes

strength of the rail by 50 per cent, a figure which is maintained after exposure to corrosion. Results of these tests are shown in the curves on page 511.

Trial lengths of rails with work-hardened bolt holes were laid two years ago in Dove Holes Tunnel, London Midland Region, and the Severn Tunnel, Western Region, where, because of the wet conditions which prevail, the life of rails is very short, and the corrosive influences present may accelerate the occurrence of star cracking at the rail ends. The rails have since been removed and shortly will be subjected to fatigue tests to determine how well they have withstood service under the severe conditions which obtain in these tunnels.

Rails laid in switches and crossings are also susceptible to star cracking failures and for this reason it has been decided to apply the work-hardening process to crossing rails. Experiments have been made at the works of Taylor Bros. (Sandiacre) Ltd. with a large crossing for Derby Station, London Road Junction, fabricated in 95 lb. b.h. rail. All the holes in these rails, with the exception of stretcher-bar holes in the switch blades, were work-hardened, including those for driving-fit bolts. For these the tool was specially designed to give a finished bolt size correct to within ± ·001 in. after allowing for elastic recovery in the hole.

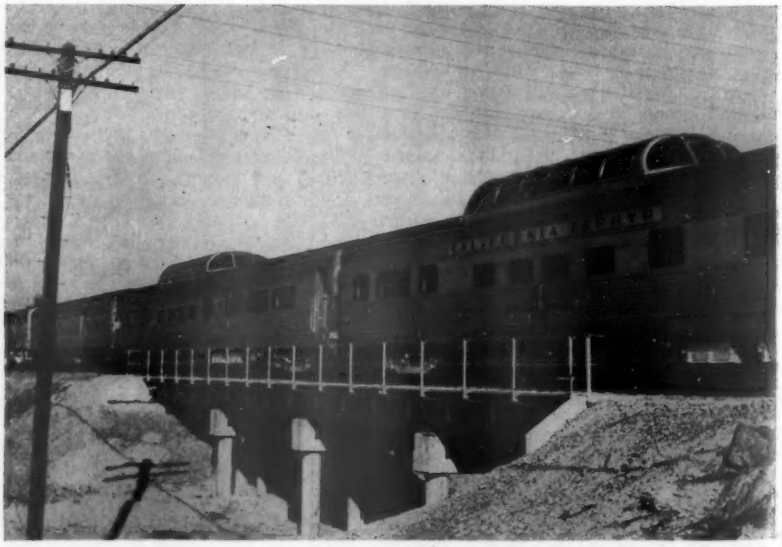
No trouble was experienced in work-hardening any of the holes, including those where the axis is inclined to that of the rail. Several hundred holes were treated without noticeable wear of tools.

Economical Pre-stressed Concrete Bridge

(*Concluded from page* 510)

the brackets and resting on the deck retain the ballast traversely. The deck was erected span by span, the old timber stringers being cut to rest on the new capping girders as necessary; the time taken to erect each span was thus only 1-1½ hr.

Though costing slightly more than a timber structure this bridge is expected to have three times the life of a timber trestle bridge and, besides being fireproof, to require negligible maintenance. The whole work was carried out under the general supervision of Mr. F. R. Woolford, Chief Engineer, Western Pacific Railroad.



"California Zephyr" crossing completed new Mormon Channel Bridge

BRITISH WATERWAYS DISPLAY OF CANAL PLEASURE CRAFT.—The first display of canal pleasure craft organised by British Waterways, is being held at the Canal Basin in Gas Street, Birmingham, a few yards from the centre of the city. It was opened last Monday by Sir Reginald Kerr, General Manager of British Waterways. The display is open free to the public from 2.30 to 9 p.m. until tomorrow (Saturday), and is floodlit in the evenings. A variety of canal pleasure boats is on view, ranging from two-berth cabin cruisers, available for hire at £10 a week, to cruising vessels which operate the five-day "Heart of England" cruises. A notable feature is a British Waterways four/six-berth "Water" class cabin cruiser, suitable for family holidays. Also on view is some of the recently-introduced floating equipment used for canal maintenance. The Canal Basin at Gas Street was specially prepared for the display. The civic authorities co-operated with British Waterways and made many improvements to the surrounding area.

RAILWAY NEWS SECTION

PERSONAL

Mr. L. N. Mathur, Chief Electrical Engineer, Central Railway of India, has been granted an extension of service for one year and will serve as Director, Electrical Engineering, Indian Railway Board.

Mr. R. B. Lal, M.Sc., General Manager, Central Railway of India, who, as recorded in our April 1 issue, has retired, was born in 1905, and educated at Allahabad University. Mr. Lal joined the Indian Government Railways in 1926 as Assistant Transportation Superintendent of the G.I.P.R. He occupied several positions in the Operating, Commercial and Personnel Branches on that system, and then moved to the Central Railway. He later served as Divisional Officer and as a Senior Operating Officer at headquarters. In 1944 he was promoted to administrative rank. Until 1952 he worked as the Deputy Chief Operating Superintendent, except for a brief period when he worked as Divisional Superintendent, Jhansi, and as Deputy General Manager (Staff). Mr. Lal for a while was attached to the Southern Command as Railway Liaison Officer. In 1952 he became Chief Operating Superintendent, Central Railway, and in 1955 he was made a member of a committee which examined the pattern and working of running sheds on Indian Railways. In December, 1957, he attended the Bangkok meeting of the Railway Sub-Committee of the United Nations Economic Commission for Asia and the Far East (E.C.A.F.E.). He later made a study tour of the railways in Malaya and Thailand. Mr. Lal became General Manager of the Central Railway in June, 1959.

Mr. R. B. Lal

General Manager, Central Railway, India, 1959–60

Mr. M. C. Purbrick, Assistant District Engineer, Manchester, London Midland Region, British Railways, has been appointed District Engineer, Derby North.

Mr. A. Fielding has been appointed a member of the Transport Users' Consultative Committee for the East Midland Area until May 31, 1962. He becomes one of the representatives of commerce to replace Mr. S. French, who has resigned.

Mr. S. P. Tonse, Officiating Deputy Chief Electrical Engineer, Western Railway of India, has been appointed Officiating Chief Electrical Engineer, Southern Railway.

Mr. W. H. Holmes has been appointed Commercial Assistant to the Portmaster, Grimsby & Immingham Docks, British Transport Docks. He will be responsible for trade development of the port.

Mr. M. Sundaresan, Officiating Joint Director, Steel Procurement, Indian Railway Board, has been appointed Officiating Joint Director (Stores Code). This is a newly-created appointment. Mr. V. N. Agharkar, Deputy Controller of Stores, South Eastern Railway, has been appointed Officiating Joint Director, Steel Procurement, Indian Railway Board.

Maj.-General P. G. Whitefoord has been appointed a Member of the Central Transport Consultative Committee for Great Britain until December 31, 1960, to represent local authorities. He replaces Major J. R. H. Harley, who has resigned from the Committee owing to ill health.

Mr. D. R. Khanna, Chief Operating Superintendent, Central Railway of India, who, as recorded in our April 1 issue, has been appointed General Manager of that system joined the former North Western Railway as Assistant Traffic Superintendent in 1930. In 1941 he became Senior Commercial Officer at Headquarters, Lahore. Later he worked as Divisional Transportation and Divisional Commercial Officer. In 1947 he attained Administrative Rank as Deputy Commercial Manager, North Western Railway, Lahore. After Partition, he joined the former Bombay, Baroda & Central India Railway as Deputy Chief Traffic Manager (Claims) in Bombay. Mr. Khanna played an important part in the reorganisation of the Claims Branch and the settlement of compensation on the B.B.C.I.R. In 1948 he moved to Ajmer, as Traffic Superintendent, and was closely connected with the Jaipur Session of the Indian National Congress, and the regrouping of the B.B.C.I.R. Mr. Khanna was promoted to be Chief Operating Superintendent of the Western Railway in 1955, and dealt with the Second Five Year Plan as it affected that system. In June, 1959, Mr. Khanna became Chief Operating Superintendent Central Railway.

Mr. D. R. Khanna

Appointed General Manager of the Central Railway, India

The late Mr. W. Crawford

Assistant to Superintendent of Operation, Southern Region, 1951-54

We regret to record the death on April 16, at the age of 70, of Mr. W. Crawford, M.B.E., Assistant to the Superintendent of Operation, Waterloo, Southern Region, British Railways, 1951-54. Mr. W. Crawford began his railway career in September, 1904, when he entered the Superintendent's Office of the former South Eastern & Chatham Railway. After extensive experience of train running work at Headquarters, he became Chief of Trains Section, Southern Railway, in 1945, and was appointed Assistant to the Superintendent of Operation at Waterloo in 1951. Mr. Crawford was awarded the M.B.E. in the 1948 Birthday Honours List. He retired in May, 1954, after nearly 50 years service.

THE LATE MR. S. A. FITCH

The funeral service to the late Mr. S. A. Fitch, O.B.E., D.C.M., M.M., Assistant General Manager (Traffic), Southern Region, British Railways, took place on March 22 at St. James's Church, Friern Barnet. In addition to family mourners the following were among those present:

Ministry of Transport and other

Brigadier C. A. Langley, Chief Inspecting Officer, Railways, and Colonel W. Reed, Inspecting Officer, Railways, Ministry of Transport; Lt.-Colonel P. M. Brooke-Hitching.

British Transport Commission

Mr. A. E. Flaxman, Chief Freight Officer (also representing Mr. E. W. Arkle, Chief Traffic Officer, B.T.C.); Mr. J. E. Binks (also representing Sir Philip Warter, Chairman, and Members of the Southern Area Board).

Southern Region

Messrs. C. P. Hopkins, General Manager; D. McKenna, Assistant General Manager; P. A. White, Acting Assistant General Manager (Traffic); R. E. Sinfield, Shipping & Continental Manager; W. J. A. Sykes, Chief Mechanical & Electrical Engineer; F. W. Burton, Regional Accountant; W. S. Stapleton, Treasurer; J. Lawrence, Chief of Police; F. D. Y. Faulkner, Public Relations & Publicity Officer; Mr. A. Earle Edwards, Operating Officer; N. L. Collins, Trains Assistant; A. Edwards, Assistant to Operating Officer; G. R. M. Robinson, Indoor Assistant; R. Sutton, Head of Trains Section; L. J. Murrell, Head of Rolling Stock Section; S. E. Medhurst, Personal Assistant to Mr. Fitch.

Messrs. F. B. Taylor, Commercial Officer; E. J. Mattocks, Assistant (Freight); G. A. Weeden, Motive Power Officer; G. Chrimes, Train Running Assistant; F. Marshall, Staff Assistant; W. H. Nicholson, District Motive Power Superintendent, Nine Elms; P. M. Haydon, District Motive Power Superintendent, Brighton; H. C. Walter, Assistant (Long Term Traffic Intelligence); T. R. V. Bolland, Acting Line Traffic Manager, South Eastern Division; T. E. Jackson, Freight Assistant; J. Rodgers, District Motive Power Superintendent; H. E. Barber, District Traffic Superintendent, London West; W. C. Collins, District Traffic Superintendent, London Central; A. C. Payne, DistrictTraffic Superintendent, Southampton.

Messrs. W. T. Fearne, Stationmaster, Victoria; T. A. Haddrell, Stationmaster, Charing Cross; S. T. Stanbridge, Stationmaster, London Bridge; R. A. Bridger, Senior Assistant Stationmaster, Waterloo (also representing Mr. E. G. Down, Stationmaster); E. G. Clarke, Stationmaster, Littlehampton. G. F. George, Co-ordinating Assistant (Consulting Engineers), (also representing Mr. A. H. Cantrell, Chief Civil Engineer); A. E. Hoare, Mechanical Engineering Assistant, Chief Mechanical & Electrical Engineer's Department; A. E. Diggens, Assistant (Wages Staff) (also representing Mr. H. C. Lang, Regional Establishment & Staff Officer).

Former Officers

Messrs. W. H. F. Mepsted, former Chief Development Officer; S. W. Smart, former Superintendent of Operation; P. Nunn, former Traffic Superintendent, London East District; W. Scutt, former District Traffic Superintendent, Southampton; J. H. Brown, former Assistant to Chief Operating Superintendent; T. R. Martin, former Head of Trains Section; S. Weller, former Head of Rolling Stock Section; C. N. Anderson.

Eastern Region

Mr. W. N. Turnbull, Passenger Assistant (also representing Mr. A. A. Harrison, Assistant General Manager).

London Midland Region

Mr. L. W. Cox, Assistant General Manager (Administration); Mr. D. M. Howes, Assistant (Freight Services), (also representing Mr. S. H. Gould, Operating Officer).

Western Region

Mr. A. C. B. Pickford, Assistant General Manager (Traffic); Mr. J. W. J. Webb, Regional Accountant.

Pullman Car Co., Ltd.

Mr. E. J. Morris, Secretary (also representing Mr. F. D. M. Harding, Managing Director & General Manager).

Mr. Alexander H. Hart, Vice-President of Traffic, Canadian National Railways, has been elected to the board of Directors of the Grand Trunk Western Railroad, a subsidiary of the C.N.R. He succeeds Mr. Maynard A. Metcalf, whose retirement as Vice-President of Traffic, C.N.R., was recorded in our January 29 issue.

We regret to record the death on April 20, at the age of 70, of Mr. R. P. Creagh, a Director of Simms Motor & Electronics Corporation Limited. Mr. Creagh was appointed to the board of Simms Motor Units Limited in 1948, and joined the board of the present company when it was formed in 1957.

Mr. J. L. Russell, Assistant Chief Traffic Manager, New South Wales Government Railways, and Mr. H. L. Watsford, Chief Assistant Electrical Engineer, are making a three-month tour of Great Britain, Europe, U.S.A. and Canada. They will study the latest railway operational and technical developments and will pay particular attention to freight handling, hump yards, and methods of ticket-issuing.

Mr. S. Ridgway

Appointed Locomotive Works Manager, Swindon, Western Region

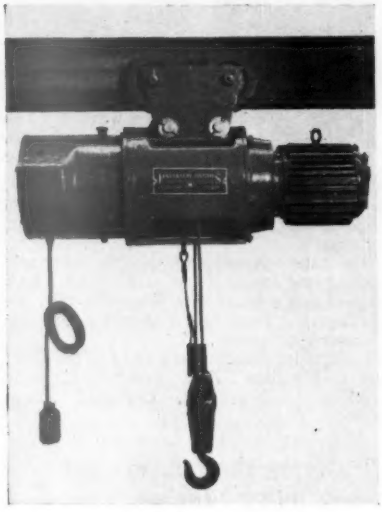
Mr. S. Ridgway, A.M.I.Mech.E., M.I.Loco.E., Senior Production Assistant to the Chief Mechanical & Electrical Engineer, Swindon, Western Region, British Railways, who, as recorded in our April 8 issue, has been appointed Locomotive Works Manager, Swindon, began his railway career, in 1931, as an Engineering Apprentice, at Crewe Locomotive Works, London Midland & Scottish Railway where he subsequently served as a draughtsman. In 1939, Mr. Ridgway joined the Indian Railways. He served in various positions on Bengal-Assam Railway, including Assistant Works Manager, Saidpur, Bengal, and District Mechanical Engineer, Badarpur, Assam. During the latter part of his service abroad, which ended in 1945, the railway was under military control and Mr. Ridgway held the rank of Major I.E. He returned to England in November, 1945, and joined Beyer Peacock & Co. Ltd., as Process Engineer, later becoming Assistant Works Manager. From 1950 to 1958, he served with W. G. Bagnall & Co. Ltd., Stafford, as Works Manager. While with this firm, visited America to study diesel locomotive construction. Mr. Ridgway rejoined British Railways in February, 1958, as Senior Production Assistant to the Chief Mechanical & Electrical Engineer, Western Region, Swindon, the position he vacated upon taking up his present appointment.

Mr. George Beebee has been appointed Comptroller, British Divisions, Yale & Towne Manufacturing Company. Mr. Beebee was formerly Assistant Comptroller. He succeeds Mr. Sewell.

Mr. C. J. Williams has been appointed General Sales Manager, and Miss B. P. Parr becomes Safety Sales Manager of Optoshield Limited, the newly-formed subsidiary of the Fleming-B.A.O. group. Reference to the new company is made elsewhere in this issue.

Mr. K. G. Kenrick, a Supervising Consultant, Associated Industrial Consultants Limited, has been appointed a Regional Manager. In recent years, he has been associated with the development of management techniques on British Railways and was partly responsible for the development of the first Work Study Schools, British Transport Commission.

NEW EQUIPMENT AND PROCESSES



Electric Hoist Block

THE Patterson Hughes one-ton electric hoist is of a new design and has a wide range of applications. It can be trolley-mounted or used as a base-mounted winch.

The hoist is totally enclosed and all shafts are ball- or roller-bearing mounted. The drive gears run in a totally enclosed oil bath. It is fitted with a powerful electro-magnetic brake and is operated by a contactor-type controller with push-button operation. A limit switch is incorporated to prevent over-hoisting.

The block provides three hoisting speeds: 15, 22½, and 30 ft. per min. A two-speed motor can be fitted.

Further details can be obtained from the manufacturer, Patterson Hughes Engineering Co. Ltd., Bedford House, Bedford Street, London, W.C.2.

Crystal Chronometer

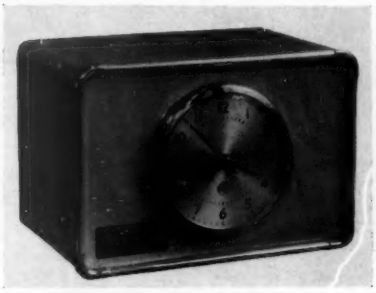
THE A.T.E. Crystal Chronometer is an all-electronic precision pulse source which is claimed to have a time-interval accuracy of the order of a few sec. per annum. It is also claimed to reduce the wide gap in performance and cost between conventional mechanical or electro-mechanical clocks and the extremely precise Caesium atomic clock.

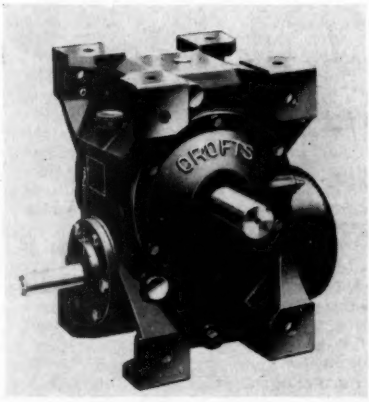
As it is stated to be unaffected by vibration or movement it should be suitable for installation in trains and on board ship. Standard models operate on 24 V. d.c., but other voltages can be accommodated. A crystal-controlled oscillator generates a basic frequency which is fed to a series of binary dividers, the outputs of which are fed to separate pulsing relay circuits. The special circuits are completely transistorised and make extensive use of plug-in printed circuit panels.

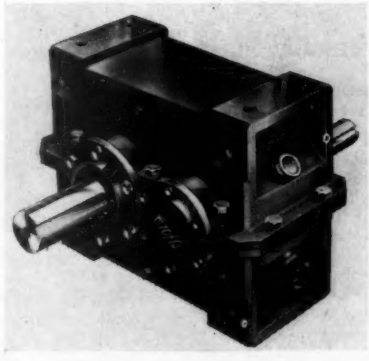
The standard chronometer for general application produces three square-wave pulses at intervals of 1, 30 and 60 sec. respectively, but other pulse output rates can be provided.

Frequency stability is achieved by operating the crystal over a part of its characteristic. This compensates automatically for fluctuations in the crystal frequency due to normal daily temperature changes. Where the temperature variation is excessive, a thermally-compensated crystal oscillator is used. This requires neither heaters nor thermostats and therefore consumes no extra power.

Further details may be obtained from Communication Systems Limited, Norfolk House, Norfolk Street, London, W.C.2.







Universally-Mounted Gears

COMPLETE universality of mounting is the outstanding feature of the new Crofts "Par-O-Mount" gear units, which will be on view from May 3 to May 13 at the Mechanical Handling Exhibition at Earls Court.

There are two types—single reduction worm gears and single reduction single helical gears. Each is adaptable to a wide variety of mounting positions, shaft dispositions, and ratios of speed reduction.

Gear cases have integrally-cast feet, machined and drilled on all faces. Seven sizes of worm gear, up to 5-in. centres, cater for powers from fractional up to 25 h.p. Stock ratios are from 5: 1 to 70: 1.

The single helical gears are available in a range of sizes from 3-in. to 10-in. centres, with standard ratios up to 6: 1, for powers up to 600 h.p.

Further details regarding these gears can be obtained from the manufacturer, Crofts (Engineers) Limited, Thornbury, Bradford 3, Yorkshire.

Heavy-Duty Terminal Blocks

KABI heavy-duty unit terminal blocks are now available in 120A, 150A, 200A and 300A sizes.

They consist of moulded blocks with rigid P.V.C. side shields in single or multiple units supplied with or without transparent P.V.C. covers.

The fittings incorporate electro-tinned brass terminal studs and links. Cast brass cable sockets to suit conductors and a label strip are also supplied.

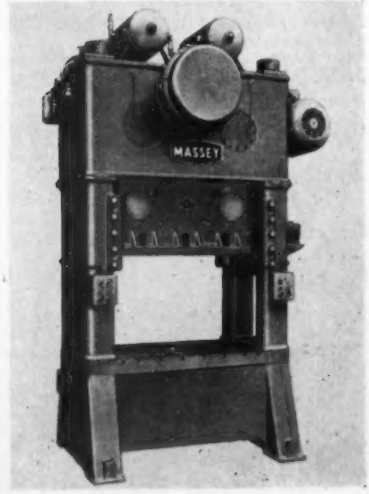
Further details can be obtained from the manufacturer, Precision Components (Barnet) Limited, 13, Byng Road, Barnet, Herts.

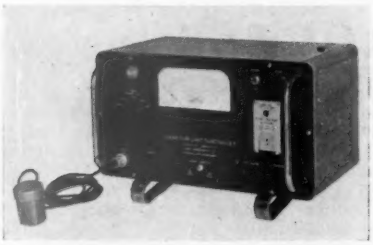
Trimming & Setting Press and improved Drop Hammer

MASSEY Wide Ram presses are designed for pre-forming and finishing drop forgings in addition to the usual trimming operations. Sizes range from 100 to 1,000 tons capacity with table working areas of from 46 × 30 in. to a maximum of 84 × 50 in.

Each press has four one-piece cast-steel pitmans to ensure good resistance to tilting of the ram. All bearings have generous proportions and the clutch is of the direct, air-operated, friction type. The lubrication unit is automatically interlocked with the main press drive. Alloy-steel double-helical gears form the transmission. The frame, which consists of a bedplate, uprights, and crown, is of welded-steel boxed construction for maximum strength and held together by four large-diameter steel bolts shrunk into position.

The manufacturer's "Marathon" drop hammer has been improved, and now is available in sizes ranging from 10 cwt. to





40 cwt. Electrically-driven, the "Marathon" is economic to run. Shock-insulated headgear reduces vibration to a minimum and Fenner torque-arm speed-reducing units reduce consumption and raise general efficiency. Accurate die alignment is ensured by the exceptionally large areas of contact between standards and anvil block: resilient pads are now fitted not only to the horizontal, but also to the vertical faces of the spigots. The recently-developed aeromatic gear which has been adopted as standard, enables the operator to control the hammer by a single pedal or the gear can be disconnected and the hammer manually controlled.

Further details of both these machines can be obtained from the manufacturer, B. & S. Massey Limited, Openshaw, Manchester.

Vibration Limit Controller

THE Type "1434" Vibration Limit Controller will shut down a machine or structure or operate an alarm when vibration exceeds a pre-determined level.

The principle of the controller is that a signal derived from a pick-up connected to a machine is compared continuously with a pre-set bias voltage. When the received signal rises above the bias voltage, a heavy-duty relay either switches off the machine or sounds an alarm.

The vibration pick-up is of a robust moving-coil design and hermetically sealed to maintain accuracy under conditions of high temperature and humidity. Using twin-screened leads of 200 ft., the controller may be placed at a safe distance from the pick-up in the case of dangerous or inaccessible locations.

The pick-up is designed to provide an output voltage, over the frequency range from 20 to 400 cycles, of direct proportion to the velocity of vibration of the contact surface. A displacement signal is obtained by applying the pick-up output voltage to an integrating network. The d.c. signal obtained operates a meter calibrated in peak values of displacement for a simple harmonic motion applied to the pick up.

Four ranges are obtainable: 0–0·001 in., 0–0·003 in., 0–0·010 in., and 0–0·030 in. The controller can be set to trip at any vibration level between 20 and 100 per cent of the f.s.d. of the meter on any range.

The instrument consumes 40W. and can be operated from 110V. or 200–250V. 50–60 cycle mains. Overall dimensions are: 10 in. x 14 in. x 9 in. and weight is approximately 24 lb. The pick-up is $1\frac{1}{4}$ in. dia. x $2\frac{3}{4}$ in. long (without probe) and weighs 1 lb.

Further details can be obtained from Dawe Instruments Limited, 99, Uxbridge Road, London, W.5.

Non-corrosive Valves

NON-CORROSIVE screw-down valves suitable for use with compressed-air or hydraulic systems have been added to the existing range of Enots solderless fittings. The smaller sizes for from $\frac{5}{16}$ in. to $\frac{3}{8}$ in. o.d. tubes, have a maximum working pressure of 1,000 lb. per sq. in; sizes up to $1\frac{1}{8}$ in. are suitable for up to 500 lb. per sq. in.

Further details may be obtained from Benton & Stone Limited, Aston Brook Street, Birmingham, 6.

Versatile Cup and Holder

WESLON WARE cups and holders are moulded by Pioneer Plastic Containers Limited from the Shell Chemical Co. Ltd.'s "Carinex" polystyrene. They are light and tough and sufficiently inexpensive to be disposed of after a large catering order, but they can be easily washed in a mixture of water and mild detergent.

They can hold all types of hot and cold food and drink, and a small handle on the holders makes them suitable for prawn cocktails, fruit salads, and jellies at buffet receptions where food is taken standing up. Used alone, the holders make good containers for snacks.

The cups can withstand boiling water and possess low conductivity—a property which ensures that contact with them will not burn the fingers. They do not shatter or splinter if they are dropped.

Further information can be obtained from the distributors, West London Catering Services Limited, 204, Uxbridge Road, London, W.12.

Measuring Instruments and Coil-winding Machine

TWO new measuring instruments and a coil-winding machine have been added to the range of Avo products.

The valve characteristic meter Mark 4 incorporates a considerably increased facility for the correct setting of negative grid potentials, particularly at low values; more accurate and concise methods for determining grid current—in particular when the valve under test suffers from reverse or primary emission; additional anode voltages for testing the recently-introduced low-anode voltage valves; improved regulation of the anode and screen voltage supply to reduce reflected impedance problems, and overload protection for the movements.

The transistor analyser (CT. 446) is a compact portable and battery-operated tester for checking transistors—N.P.N. or P.N.P. of the small signal and medium-power types. It is suitable for taking Ib/Ic characteristics with a choice of Vc, the transistor being in the grounded emitted configuration. Beta can be measured at any pre-determined point on the Ib/Ic characteristic and I'co is directly indicated in μA.

Provision has been made for the measurement of transistor noise.

The Supermatic coil-winding machine is capable of winding almost perfect layer-wound coils without the use of any medium of interleaving.

Further details can be obtained from the manufacturer, Avo Limited, "Avocet House," 92–96, Vauxhall Bridge Road, London, S.W.1.

Exhibition of B.R. Motive Power and Rolling Stock

Electric and diesel locomotives and passenger and goods vehicles shown at Marylebone Goods Depot on occasion of Institute of Transport Congress

In connection with the Institute of Transport Congress, 1960, held in London this week, an exhibition of British Railways locomotives, passenger and goods vehicles, and containers was arranged at Marylebone Goods Depot, N.W.1, for inspection by those attending the Congress and by the Press.

The exhibits were as follow:—

Electric Locomotives

25-kV. a.c. Bo-Bo main-line electric locomotive : This was built by the General Electric Co. Ltd., with mechanical parts designed and constructed by the North British Locomotive Co. Ltd. The locomotive was described and illustrated in our April 22 issue. It is in blue livery, which is standard for all main-line a.c. locomotives.

675-d.c. main-line electric locomotive : Built at Doncaster Works, British Railways, for the Southern Region lines electrified on the third-rail system, this includes electrical equipment supplied by the English Electric Co. Ltd. Pantographs are fitted for collecting current from overhead contact system in sidings and yards. The locomotive was described and illustrated in our February 13, 1959, issue.

Diesel Locomotives

Type "2" *1,160-h.p. main-line diesel-electric locomotive :* Built at British Railways Derby Works for passenger and freight duties, it can work singly or in multiple with other diesel-electric locomotives with English Electric, Crompton-Parkinson, or A.E.I. electric transmission. It was described and illustrated in our July 25, 1958, issue, and in the October, 1958, issue of our associated journal *Diesel Railway Traction.*

Type "4" *2,000-h.p. main-line diesel-electric locomotive :* Built by the English Electric Co. Ltd., it is intended primarily for passenger duties. If necessary, it can work in multiple with many other types of diesel-electric locomotive. The locomotive was described and illustrated in our April 25, 1958, issue and in the June, 1958, issue of *Diesel Railway Traction.*

Passenger Vehicles

Driving trailer of multiple-unit a.c. electric train: This is a leading vehicle of the three-car multiple-unit electric trains for the Glasgow Suburban electrification scheme. The bodies are being built by the Pressed Steel Co. Ltd., and electrical equipment is being supplied by the Metropolitan-Vickers Electric Co. Ltd. (now part of the A.E.I. Group). The car has two doorways in each side fitted with double air-operated sliding doors, which open into cross gangways. The passenger accommodation is in three open saloons, seating 75. The vehicle is built on a British Railways standard underframe mounted on wide-bearing double-suspension-type bogies.

Motor coach of three-car a.c. electric suburban train: The passenger accommodation totals 96 seats in compartments. The guard's accommodation in the luggage van is equipped with a telephone for communication with the driver. The main electrical equipment is mounted underfloor and includes transformers and rectifiers to convert the a.c. supplies into direct current for the four 200-h.p. nose-suspended axle-hunt traction motors. The car is built on a British Railways standard underframe mounted on wide-bearing double bolster motor bogies, each equipped with two traction motors (one per axle), and has electro-pneumatically operated air brakes. The coach was built in British Railways York Works, with electrical equipment supplied by the General Electric Co. Ltd. It is designed for service in the Eastern Region.

Trailer composite of four-car multiple-unit diesel train: Designed for high-density suburban service, each unit is powered by four 230-h.p. diesel engines, mounted beneath each driving car. The car was built at British Railways Derby Works.

Standard second class sleeping car: Accommodation for 22 passengers in 11 two-berth compartments. With an attendant's compartment with propane-gas water heater and tea boiler. Heating and ventilation are by Thermotank units. The vehicle was built at British Railways Wolverton Works.

Kitchen-buffet car.—This vehicle was built by Cravens Limited. It is designed to provide continuous light refreshments besides a full restaurant service. The interior includes a buffet section 16 ft. 9 in. long at one end of the car, including a 10-ft. long service bar, and the remainder is occupied by a kitchen, pantry, store, and staff accommodation. Up to 120 main meals can be served in adjoining saloon carriages. Cooking is by propane gas.

Restaurant car (unclassed): Designed to provide an intensive service of main meals in its own saloon, the vehicle seats 33 passengers of either or both classes, and its kitchen can also serve meals at two or more sittings in adjoining saloon coaches. The vehicle was built at British Railways Swindon Works.

Wagons for Special Traffics

"*Presflo*" *air-discharge wagon :* Built by the Central Wagon Co. Ltd., this 20-ton all-steel enclosed airtight wagon can be pressurised for air discharge. With an air pressure as low as 20 lb. per sq. in., and a flow of 200 cu. ft. per minute, it is possible to deliver to bunkers or silos as high as 50-60 ft. above rail level, a 20-ton load in almost as many minutes. The vehicle can convey commodities such as cement, salt, fuller's earth, slate dust, alumina, powdered lime, and pulverised fuel.

"*Prestwin*" *air-discharge wagon:* This vehicle is discharged in the same way as a Presflo wagon, but is designed to operate at higher air-pressure. The wagon is suitable for conveying a wider range of commodities than the Presflo including materials such as pyrophosphates, ground silica, sodium perborate, soda ash, and flour. The name "Prestwin" is derived from the twin load-carrying airtight hoppers, which can be discharged by air pressures as high as 45 lb. per sq. in. It was built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd. The wagon was shown linked by pipes with a road vehicle.

Fitted plate wagon: With flat floor and low sides the wagon is used for carrying steel plates, machinery, heavy cased goods, and vehicles. The maximum load is 22 tons in weight, including steel plates up to 27 ft. long and 8 ft. 4 in. wide. The wagon is equipped with vacuum brakes for high-speed running, construction was at British Railways Shildon Works.

"*Palbrick*" *wagon:* Built at Ashford Works, British Railways, the design ensures that the pallet loads are firmly held. The loaded pallets are separated by plywood shields, and an adjustable screw attachment fitted to one of the strengthened ends of the wagon tightens the entire wagon load. The sides of the wagon can be removed for easy loading.

The two types of container on view are both experimental. They represent two approaches toward reducing the tare weight.

Containers

Light-Alloy container: This has a tare weight of only one ton but can carry a load of five tons, and has a capacity of 500 cu. ft. Features include a flat top, which makes it stackable, and it can be handled by cranes or high-capacity fork-lift trucks. Construction was by the Northern Aluminium Co. Ltd. The container was shown unpainted, in good condition after two years' service.

Glass-Fibre container: This is one of six experimental containers of one-piece moulded construction in colour impregnated, glass reinforced plastic. It can carry five tons and has a capacity of 440 cu. ft. It has doors at each side and at one end, each of which is hinged horizontally at the centre and is so designed that when lowered it forms a chamfered loading ramp. The doors are hermetically sealed when closed and are covered by sliding shutters. The container was built by Mickleover Transport Limited.

Aluminium in Railway Rolling Stock

A symposium on the use of aluminium in railway rolling stock is to be held jointly by the Institution of Locomotive Engineers and the Aluminium Development Association on May 27 at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1. It will consist of two sessions, one arranged for the morning from 10 a.m. until 12.30 p.m., and the other in the afternoon from 2.30 p.m. until 5 p.m. The morning session will comprise papers dealing with matters under the broad heading of design and construction, and the afternoon session with matters relating to operation and service experience. The symposium will be opened by Mr. R. A. Smeddle, M.I.Mech.E., President of the Institution of Locomotive Engineers.

The programme of papers to be presented and discussed is as follows :—

Morning session—10 *a.m. to* 12.30 *p.m.*

Design and construction, under the Chairmanship of Mr. R. A. Smeddle :—

1. "The properties of aluminium," by E. G. West, Ph.D., F.I.M. This paper will not be read or introduced, but will be available for reference purposes.
2. "General aspects of design in aluminium," by J. F. Thring, A.M.I.Mech.E., A.M.I. Loco.E.
3. "Stress analysis of integral vehicle structures," by Professor D. N. de G. Allen, M.A., and D. W. Windle.
4. "Impact behaviour of vehicle structures," by Professor Sir Alfred Pugsley, O.B.E., D.Sc., F.R.S.
5. "Construction of aluminium vehicles," by S. White, M.I.Loco.E.

A discussion will be followed by authors' replies.

Afternoon session—2.30 *p.m. to* 5 *p.m.*

Operation and service experience under the Chairmanship of Mr. W. Brining, President of the Aluminium Development Association :

6. "Experience with subway rolling stock," by A. W. Manser, M.I.Mech.E., Vice-President of the Institution of Locomotive Engineers.
7. "British Railways experience with light-alloy diesel railcars," by A. E. Robson, M.B.E., M.I.Mech.E., Member of Council of the Institution of Locomotive Engineers.
8. "Assessment of economies obtained with lightweight rolling stock," by F. L. Stafford, M.I.Mech.E., M.I. Loco.E.

The following papers will be introduced by Mr. D. C. Brown, C.B.E., B.Sc.(Eng.), M.I.C.E., M.I.Mech.E., President-elect of the Institution of Locomotive Engineers, who will act as rapporteur :—

9. " Experience in Canada," by R. A. Campbell, Manager, Development Division, Transportation Director, the Roberval & Saquinay Railway, Aluminum Company of Canada.

10. " Experience in France," by Monsieur Dupré, Directeur de l'usine, Societe de Construction et de Reparation de Materiel Ferroviaire, Rheims.

11. " Experience in East Africa," by J. Hudson, M.I.Mech.E., M.I.Loco.E., Chief Mechanical Engineer, East African Railways & Harbours, Nairobi, Kenya.

12. " Experience in Germany," by Dr. Ing. A. Mielich, Abteilungspräsident, Bundesbahn-Zentralmant, Minden, Western Germany.

13. " Experience in the United States of America," by G. B. Hauser, F.A.S.M.E., Manager, Railroad Section, Sales Development Division, Aluminum Company of America.

A discussion will be followed by authors' replies.

Conveyance of Motor Cars in Western Region

Over 43,000 motor cars were transported by British Railways, Western Region, during the past year, an increase of nearly 20 per cent over the previous year.

A stock of specially constructed covered vans, with end doors. is maintained. Cars are run straight into the wagons from a loading ramp and through from one van to another. The vans are fitted with transverse bars which bear on the front and rear wheels of the car and prevent movement during transit. Nearly 600 of these wagons of varying dimensions are available, to accommodate cars of different lengths and more than one car, if required.

At present, with the boom in motor-car production, the existing stock of covered vans is insufficient to meet the demands. The car manufacturers have agreed to saloon type cars being conveyed on flat open wagons, and the Western Region has provided 100 vehicles for this purpose, a further 100 conflats are being converted. The construction of another 132 flats, by converting coaching stock underframes, is being undertaken. These vehicles will convey four cars each and will be used, mainly, for the transport of cars for export, to selected ports in Britain.

Experimental Wagons

As an experiment two-tier wagons, each accommodating six cars, are also being tried out with the view to their use for through working to the Continent.

The Western Region also conveys steel motor-car bodies, either bare or complete with upholstery, from the works of the Pressed Steel Company at Morris Cowley to various manufacturers. These are conveyed on " Bocars," constructed from the underframes of obsolete coaching stock with a steel skeleton framework, boarded ends, and sides draped with tarpaulins. The motor-car trade imports large quantities of parts and bodies from France for the Renault and Citroen Works at Park Royal (London) and Slough respectively. These are conveyed in through ferry-trucks from the maker's factories in Paris. After final assembly at Park Royal and Slough, the completed vehicles are distributed throughout the country.

Report of Channel Tunnel Study Group

Twin-bore railway tunnel a practical possibility, with construction in five years. Funds to be raised in money markets

Last week, on behalf of the Channel Tunnel Study Group which comprises: the Channel Tunnel Co. Ltd.; the Société Concessionnaire pour le Chemin de Fer Sous-Marin entre la France et l'Angleterre, with which is associated the International Road Federation (Paris Office); the Compagnie Financière de Suez; and Technical Studies Inc., of New York, Sir Ivone Kirkpatrick and M. Rene Massigli, co-Chairmen, handed copies of its report to the British and French Governments.

The report gives a summary of the work carried out by the Study Group over the last 2½ years. The studies have taken into consideration the results of the many previous investigations, and projects put forward more recently.

All possible methods of spanning the Straits of Dover have been reviewed, including a bored tunnel, an immersed tube, and a bridge with provision for a road or a railway in each case.

Road Vehicles on Railway Wagons

The Study Group has reached the conclusion that a Channel Tunnel is now a practicable proposition both technically and financially. Within the framework of private financing, the most realistic approach, at least the opening phase, would be twin railway tunnels through which would operate a shuttle service ensuring rapid transit for motorcars. The tunnels would be 32 miles long. At peak periods vehicles could be conveyed under the Channel in 35 min. at a rate of 1,800 an hour and at an average speed of 60 m.p.h. Through passenger trains would make the journey from London to Paris in 4 hr. 20 min.

Estimates show that minimum traffic in 1965 would comprise 3,180,000 passengers, 676,000 road vehicles and 1,230,000 tons of freight, increasing to 4,831,000, 1,127,000, and 1,587,000 respectively by 1980.

Lower Charges

The charges to users would be appreciably lower than those at present in force, more particularly as regards motorcars and freight, at 32s. a passenger, 116s. a vehicle (with driver), and an average of 42s. a ton of freight.

The cost of construction would amount to approximately £109 million and the work would take five years. Receipts are estimated at £13 million in 1965, and £21 million in 1980.

To undertake construction, the Channel Tunnel Study Group proposes that an international company should be set up under a Franco-British treaty. This company would be granted the requisite rights and concessions and would raise the funds required in the money markets of the world.

Tentative plans for financing the project have been studied, but cannot be completed until the British and French Governments have given their approval to the proposals of the Study Group.

Railway Tunnel Preferable

The tunnel, it is suggested, should carry a railway rather than a road, mainly because of the capacity and earning potential of the proposed construction. It is argued that if a road tunnel were brought into service in 1965, its capacity would have to be doubled soon after 1980, while at this time a railway tunnel would have capacity enough to absorb 70 per cent more than the peak traffic estimated—a calculation based on 110 trains a day each way, with a theoretical capacity of 216 trains.

The earning power of a railway tunnel is estimated at £13 million gross in 1965 and £21 million in 1980. The gross receipts of a road tunnel would not be more than £9 million in 1965, and £15 million in 1980. The figures assume a substantial diversion of traffic from the seaborne service to the service of road vehicles on railway wagons between British and French terminals.

Financial Implications

On the financial implications, the Study Group points out that if the undertaking was to be financed exclusively by private capital, then various assurances would have to be forthcoming, " without which private capital could not be expected to run the risks involved." The actual cost of a railway tunnel is estimated at £80 million, to which must be added interest during construction of about £14 million, *plus* some £6 million for working capital, expenses of issue in respect of share and loan capital, and other charges.

Assuming that the cost of railway terminals, equipment and rolling stock at some £30 million, is financed by the railways, the report states that the Group has considered the problem of private financing on the basis of an investment of about £100 million.

The Group suggest that the activities of the tunnel company would be limited to financing, building and maintaining the tunnel, while its actual operation would be undertaken by the British Transport Commission and the French National Railways by a long-term lease.

For the transport of road vehicles special trains would be built, on to which cars could be driven over side-loading wagons at each end. Eventually double-deck trains would be built able to carry 300 road vehicles in a train, although the first single-deckers would be able to carry motorcoaches, with lorries conveyed on open low loading wagons of special design.

Portal Stations

The terminal railway stations would be sited between Ashford and Folkestone in England, and near Calais in France, and would be about 44 miles apart by the tunnel.

The estimated cost of a road tunnel 36 ft. in diameter would be £104 million, *plus* £17 million for ventilation plant and islands, £4 million for surface installations, and £3.6 million to alter the French road system to connect with the tunnel. A bridge is estimated to cost £181 million, and an immersed rail tube some £113 miliion, to take four years to build compared with five years for the other forms of constructions.

Mr. Leo d'Erlanger, Chairman of the English Channel Tunnel Company and a member of the Study Group, has expressed his belief that the earliest the tunnel could be ready for use would be in about six-and-a-half years from now.

ENGLISH STEEL CORPORATION LIMITED.—For the year 1959, the English Steel Corporation Limited is to pay an unchanged dividend on the " A " and " B " ordinary shares of 10 per cent, with a maintained final payment of 7 per cent, payable on June 8. Group net profits rose to £2,616,233 from £2,275,152 after tax of £1,971,990 (£2,270,124).

Increases in Railway Passenger and Freight Charges

Estimated annual contribution of £9,000,000 to meet cost of wage awards, from higher season tickets and ordinary fares, and charges for small consignments of merchandise

The British Transport Commission has announced they are to increase certain passenger fares, season ticket rates and railway merchandise charges for small consignments.

Passenger Fares

Season ticket rates and early morning fares on British Railways and London Transport are to be increased from May 8, and increases in British Railways' ordinary fares are to be made " as soon as practicable" after that date, and on London Transport trains and buses the 4d. and 5d. fares will rise by 1d.

The general level of increase in British Railways ordinary passenger fares will be about ¼d. a mile second class, with first class 50 per cent higher, but these increases will be progressively reduced over the longer distances.

The Area Boards have been given authority to approve variations from the general rate. The Regions will publish their new fares before their introduction.

Season ticket charges will be subject to increases ranging from 4 per cent at two miles to 14 per cent. at 26 miles and above, and early morning fares will go up by between about 10 and 14 per cent according to distance. Certain London Transport single road and rail fares will also be increased from May 8.

New Season Ticket Rates

Some examples of the new monthly season ticket rates, second class, are:

Miles	Present rate	New rate
	£ s. d.	£ s. d.
5	1 18 6	2 1 0
10	3 0 6	3 6 0
20	4 15 6	5 6 0
50	8 0 0	9 2 0
100	13 0 0	14 14 0

The new rates for weekly season tickets will be about one-quarter of the monthly rate, *plus* 10 per cent. Three-monthly rates will be about three times the monthly rate, less 10 per cent; those for six months, twice the three-monthly rate, and those for 12 months double the six monthly charges. First class rates will be about 50 per cent above second class.

Apart from the 4d. and 5d. bus and underground fares, no other London Transport ordinary road and rail fares will be affected, except that a few 6d. and 8d. fares, which were not raised last year, will also be increased by 1d.

Some rail fafes from L.T.E. stations to British Railways and certain Metropolitan Line stations will be increased when British Railways raise the general level of ordinary fares.

Early Morning Fares

Early morning single fares on road services will be increased by 1d. for a six-mile journey, and by 3d. for all longer journeys.

Increases in early morning return fares on the L.T.E. Underground will be generally: 1d. on the present 2s. 1d. fare (which now becomes ordinary return); 3d. on the present 2s. 3d. fare (now becomes ordinary return); 4d. on the present fares of 2s. 5d. to 2s. 11d.; 5d. on present fares of 3s. 1d. to 3s. 9d.; 6d. on the present fares of 3s. 11d. to 4s. 5d., and higher increases for longer journeys.

As a result of these increases, early morning fares will generally cease to apply for journeys of six and seven miles.

Underground season tickets will be increased (in line with the general British Railways rates).

Freight charges in general are not being increased, though there will be some adjustments in the scales of charges for small consignments of goods by merchandise train.

Rates for Small Consignments

An increase of approximately 10 per cent is to be made in the charges for consignments up to 3 cwt., with lower percentage increases up to 5 cwt. and certain minor adjustments in the charges for higher weights.

An increase of about 10 per cent will also apply to certain exceptional scales of charges for the conveyance of parcels and other merchandise by passenger train or other similar service.

These freight increases will take effect from May 15. Details will be available shortly at stations and depots where goods are accepted for conveyance.

Lightweight Fibreglass/Plastic Container, N.E. Region

A fibreglass/plastic container, the first of its kind to be used by British Railways, has been introduced in the North Eastern Region. Measuring 7 ft. 6 in x 6 ft. x 6 ft., it is only half the weight of a wooden container of the same size and can carry a load of 5 tons, one ton more than that of the largest of the conventional types.

Strength of Construction

The fibreglass/plastic material is strong. Corrugated to give greater rigidity, the mould is in one piece, apart from the doors. A reinforced timber plank floor allows easy replacement of worn sections.

The container is stated not to be affected by water, oils, petroleum solvents, and most chemical substances met with in normal use to have a low moisture absorption and to be proof against rodents, termites, and wood borers. Accelerated ageing tests have shown no reduction in physical properties. The container can be modified for handling by fork-lift truck and can be stacked.

The North Eastern Regional tangerine colour is impregnated in the outer plastic laminations. Painting is not required.

Design and manufacture were by Willerby Plastics Limited, with modifications to meet special railway requirements embodied in consultation with the Chief Mechanical & Electrical Engineer, North Eastern Region.

Fibreglass/plastic 5-ton capacity container, British Railways, N.E. Region, showing corrugation to give rigidity, and plain finish

Further Swiss Timetable Changes

The final proof of the Swiss summer timetables, effective from May 29, shows certain important alterations additional to those mentioned in our March 11 issue. Patronage of the night " Riviera Express " service between Basle and Chiasso by the Gotthard route is so heavy that it will run in three sections in each direction, all without advertised halt between Basle and Bellinzona. Southbound, the first section, starting from the French station in Basle and not stopping in the Swiss station, will act as a relief train to Milan only, carrying a sleeping car from Ostend, and through coaches and couchettes from Calais, Ostend and Luxembourg.

The second train, the " Italia Express," will be entirely for Rome, with sleeping cars, from Stockholm, Amsterdam, and Ostend, and through coaches from Grossenbrode, Copenhagen, Amsterdam, Ostend and Calais. The third train, the " Riviera Express " proper, will have portions, including sleeping cars, from Copenhagen, Amsterdam, Oberhausen and Cologne, Grossenbrode and Frankfurt to Milan, Genoa and Ventimiglia. Departures of the three trains from Basle will be at 2.15, 2.51 and 3.15 a.m., and arrivals in Milan at 8.2, 8.37 and 8.47 a.m. From Milan northbound departures will be at 9.46 p.m. (" Riviera "), 10.17 p.m. (" Italia ") and 10.22 p.m. (relief) and Basle arrivals at 3.26, 3.38 and 3.54 a.m. respectively. Each of these expresses takes the Olten-Aarau – Wohlen – Rotkreuz – Arth –Goldau route, avoiding Lucerne.

The new car/sleeper train between Avignon and the Altstetten Station at Zurich is now to

make its only intermediate stop at Berne and not Burgdorf, at 7.13/7.19 a.m. northbound and 11.15/11.28 p.m. southbound, which will be more convenient for the Bernese Oberland tourists. A number of the fastest point-to-point timings over this mainline, especially between Geneva and Lausanne, will be eased by a minute or so in the interests of better timekeeping.

On the narrow-gauge lines, a new train will run from Brigue to Zermatt at 5.55 p.m., arriving at 7.28 p.m., and will return at 7.55 p.m.; reaching Brigue at 9.35 p.m., this will connect with the "Lötschberg–Riviera" express, and for the first time on record will put Zermatt within just under 3½ hr. of Berne. On the Furka-Oberalp line the 8.40 a.m. from Brigue to Andermatt will be extended to Disentis, and a Rhaetian Railway connection will reach Chur at 2.11 p.m. By starting the 5.55 p.m. from Andermatt back from Disentis at 4.30 p.m., a new afternoon service will be given from Chur at 2.18 p.m. to Brigue.

B.R. "Quiz" Competition

This year's "Quiz" competition for British Railways locomotive men was won by one point by St. Margarets (Edinburgh), Scottish Region, from St. Blazey (Cornwall), Western Region, on April 21 at British Transport Commission Headquarters, London, N.W.1.

Mr. A. R. Dunbar, Manpower Adviser to the British Transport Commission, presided over the competition and presented the Challenge Cup to the winning team, the members of which will pay a week's educational visit to one of the continental railways. Mr. R. C. Bond was the Questionmaster, and the Adjudicators were Mr. J. M. Harper and Mr. A. M. G. Deakin.

A large audience of supporters of both teams included Mr. C. R. Campbell, Motive Power Superintendent, Scottish Region; Mr. D. F. Gowen, Regional Establishment & Staff Officer, Scottish Region; Mr. T. R. Hall, District Running & Maintenance Officer, Newton Abbot, Western Region; Mr. J. R. Hammond, General Manager, Western Region, Mr. R. F. Hanks, Chairman of the Western Area Board, B.T.C.; Mr. J. L. Simons, President, Associated Society of Locomotive Engineers & Firemen; Mr. S. T. Ward, Regional Establishment & Staff Officer, Western Region, and Mr. H. E. A. White, Running & Maintenance Officer, Western Region.

This inter-regional competition was the ninth in the series which is held each year to foster interest, particularly among the younger men, in the locomotive men's Mutual Improvement Class movement. Questions were put to each member of each team to test their technical knowledge of steam and diesel locomotives, the principles of fuel combustion, and of railway operating rules.

REDUCED FARES FROM SHEFFIELD AREA TO WEST OF ENGLAND.—Eight- and fifteen-day holiday return tickets from stations in the Sheffield area to certain stations in the West of England proved so popular during past summers that British Railways, Eastern Region, has decided to re-introduce this facility in July and August. The tickets offer a saving of 20 per cent on each adult ticket and will be valid for either eight or fifteen days, and available on specified trains running on Saturday evenings from July 16 to August 27.

London Transport District Line Resignalling

Introduction of two-aspect signalling on East Ham - Becontree section

The third stage in the resignalling of the eastern section of the London Transport Executive District Line was carried out recently when two-aspect signalling of the London Transport standard type was brought into use over a two-mile section of line from a point between East Ham and Barking to a point between Upney and Becontree. Two previous stages introduced new signalling between Bow Road and the western limit of the current stage.

The new signalbox at Barking is a composite building, housing both London Transport and Eastern Region boxes, which are, respectively, in the east and west halves of the building, with a stairway between. A train announcer's room over the stairway serves both boxes.

London Transport trains have the exclusive use of three platforms at Barking, Nos. 2 and 6 being the through eastbound and westbound District Line platforms respectively, and No. 3 platform a reversing bay for trains from London terminating at Barking. The westbound track approaches platform 6 at Barking through a flyunder and leaves the station area by way of a flyover, so that easy cross-platform interchange between London Transport and Eastern Region trains is provided at the station.

Barking Sidings

To the east of Barking Station a fan of nine stabling sidings has been laid down between the two District Line running tracks. These sidings, known as Barking Sidings, have accommodation for 13 eight-car trains in four double-berth single-ended sidings and five single-berth double-ended sidings. All sidings are accessible from the Barking end, and the five double-ended sidings may also be reached from connections at the Upney end.

The London Transport signalbox has a main control desk with push-button controls so arranged that one man can control all signalling worked from the box, but, when required, a second man working at an auxiliary control desk can operate the signals for the westbound road only. On both main and auxiliary desks a panel for telephone equipment is provided to the side of the push-button panels.

The push-buttons, of perspex illuminated from below by coloured lights, operate the signalling on the route-setting principle, with a separate button for each signalled route. The coloured lights show the state of the route controlled by each button. When pressed, the push-buttons operate the signalling through one of the three interlocking machines which have been brought into use. One of these machines is on the lower floor of the signalbox and controls the points and signals in the Barking Station area. The other two interlocking machines have been installed at the east and west ends of Barking Sidings.

The signalling itself is of the London Transport Executive two-aspect standard type, with long-range colour-light stop signals and repeating and fog repeating signals where required. Through the flyunder on the westbound road east of Barking, the signals are of the two-aspect short-range colour-light type. Shunt signals in the Barking Sidings area are of the electro-pneumatically operated externally-illuminated lower quadrant disc type. Theatre-type route indicators are fitted on shunt signals which can apply to two or more routes.

All points controlled from the London Transport signalbox at Barking are electro-pneumatically operated. At all stages of the resignalling work, precautionary measures are being taken against interference from the 50-cycle a.c. to be used for traction purposes on the London, Tilbury & Southend Line alongside.

BRITISH WATERWAYS HEADQUARTERS NEW ADDRESS.—The headquarters of British Waterways will be transferred as from May 9 from 163, Euston Road, to Melbury House, Melbury Terrace, N.W.1; telephone Hunter 1272; telegraphic address, Britwater, London, N.W.1.

Interior of Barking new signalbox, showing the auxiliary control desk, left, and main control desk, right

Questions in Parliament

Grants to Railway Companies

Mr. Wedgwood Ben (Bristol S.E.—Lab.) asked the Chancellor of the Exchequer on April 11 how much money was paid out in grants, and in guaranteed loans, to each of the four main-line railway companies under the Development (Loan Guarantees and Grants) Act, 1929, in each of the years 1929–39.

Mr. Anthony Barber, Economic Secretary to the Treasury: No loans to railway companies were guaranteed by the Treasury under this Act. The following are the details of grants:—

Year	London, Midland & Scottish	London, & North Eastern	Southern	Great Western	London, Midland & Scottish Railways Joint Committee	Midland & Great Northern Railways Joint Committee
	£	£	£	£	£	£
1929	—	—	—	—	—	—
1930	217	50	—	2,037	—	6
1931	11,977	10,892	5,731	32,586	58	178
1932	32,957	38,477	42,774	105,995	293	189
1933	47,494	74,596	104,503	164,177	321	189
1934	45,665	94,024	108,130	213,506	321	189
1935	45,989	99,545	122,426	229,037	321	189
1936	39,819	91,983	112,335	225,530	263	11
1937	31,073	73,300	91,396	205,494	—	—
1938	18,650	55,013	92,822	192,107	—	—
1939	11,805	45,571	93,919	185,906	—	—

Parliamentary Notes

Railways to Relieve Roads

The ability of railways to relieve much of the congested road traffic through statutory compulsion to take traffic from the roads, was argued by several speakers in the Second Reading debate on April 11 on the Road Traffic Bill.

Mr. Michael Stewart (Fulham—Lab.) said he saw the roads used for enormous vehicles, the size of railway wagons, carrying immense loads. It was not sense in a crowded island "for us to be wringing our hands about the insufficient use of the railways while this sort of thing is going on on our roads."

Sir Wavell Wakefield (St. Marylebone—C.) asked whether some very heavy loads could not go by rail because they would be out of gauge.

Mr. Stewart pointed out that much traffic should be put, in the public interest, on the railways.

Restrictions Necessary

He did not believe that as a matter of principle they could stick to the idea that it was the sole concern of the man whose traffic it was, whether it went by road or rail. Britain was not large enough to allow unrestricted use of space on roads and transport facilities. They must approach this question without prejudice. A solution which might appeal to Members opposite would be to offer special financial inducements to send traffic by rail rather than by road. Another way would be to specify the size or weight of vehicles which might travel on the road.

Roads Alongside Railways

Mr. R. Mellish (Bermondsey—Lab.) said that this Bill, that was supposed to deal with road traffic and road improvement, made no mention of the powers that the House would have to give the Minister if they were to build roads over railways. The Minister of Transport recently made a remarkable speech about roads over the railways. That was not impossible to visualise. The obvious thing for any planner for today and tomorrow was that they must build roads alongside the railways. His own constituency contained a perfect example: a whole viaduct of railway lines and not a single road alongside. In planning the cities and towns of tomorrow, the planners would see that roads were pushed as near to the rails as possible, and pedestrians given some sort of freedom of movement in the centre.

Petition Against B.T.C. Bill

Mr. Anthony Kershaw (Stroud—Lab.) presented in the House of Commons on April 13, a petition on behalf of more than 200 of his constituents of the parish of Brookthorpe with Whaddon, who were, or are likely to be, affected by the proposal in the British Transport Commission Bill, for the establishment of a marshalling yard on the east side of the railway near Gloucester. Mr. Kershaw added: Their petition was that the yard should be not on the east but the west side of the railway line where land was available, not valuable agricultural land as it was on the east side, and was largely held by the Air Ministry, and was convenient for the B.T.C. to use, instead of the valuable agricultural land.

Monorail for Passenger Transport

Mr. Clive Bossom (Leominster—C.) said he still believed (as his father, Lord Bossom, advocated) that the Monorail had a future, as over three-quarters of the people coming into our large cities to work did so by public transport. If they could lift this group off the roads they should leave the roads so much freer.

Staff and Labour Matters

London Transport Maintenance Staff

Discussions continued this week on the offer which London Transport made on April 19 in respect of its bus and underground maintenance staff. The offer gave the men the choice of a reduction in hours from 44 to 42 or an increase in pay of 8s. or 9s. a week according to grade. The underground workers seemed to favour the wage offer, while the busmen are holding out for a shorter working week. The London Transport Joint Trades Committee originally recommended acceptance of the pay increase, but this was rejected by the bus maintenance staff at Chiswick Depot, and the unions' representatives forming the London Transport Joint Trades Committee have since discussed the situation to determine their attitude when the meeting with London Transport takes place.

BEYER, PEACOCK & CO. LTD. RESULTS.—A net loss of £1,592 was incurred by Beyer, Peacock & Co. Ltd. in 1959. For the previous year net profits were £149,849. A final dividend of 12 per cent is declared, as was forecast last May. In 1958 an interim of 3 per cent was followed by a special profits tax interim of 9 per cent.

Contracts and Tenders

The International General Electric Company, New York, has received from the Colombian National Railways an order for seven 700-b.h.p. double-bogie diesel-electric locomotives.

The Queensland Government Railways has placed an order with the English Electric Co. of Australia Ltd. for the supply of five 1,500-h.p. diesel-electric locomotives. These locomotives are intended for the Townsville-Mount Isa line.

British Railways, Eastern Region, has placed the following contracts:—

Charles R. Price: reconstruction of superstructure of Lowgates overbridge No. 25 at Staveley Central Station

R. H. Neal & Co. Ltd.: supply and delivery of three three-ton mobile cranes for handling concrete sleepers

Arundel (Contractors) Limited: cleaning and painting of buildings, structures and bridges including lineside work, between Clapton Tunnel and Chingford Station

Auto-Mower Engineering Co. Ltd.: supply and delivery of two sets of end-on loading equipment to work with ballast cleaners

Charles R. Price: reconstruction of engine inspection pits Nos. 1 and 2 and engine ashpit No. 2 at Retford, Great Central, Locomotive Depot.

British Railways, Scottish Region, has placed the following contracts:

Don (Contractors) Limited: provision of diesel maintenance facilities, Inverurie

James Campbell & Son: provision of workshops and offices, demolition work, and so on, Inverness

Blackburn (Dumbarton) Limited: building of centre side walks and staircases, Queen Street Low Level Station, Glasgow.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From Iraq :

A large quantity of wooden sleepers for both metre- and standard-gauge lines.

The issuing authority and address to which bids should be sent is the Directorate-General Iraqi Republican Railways, Baghdad. Tender documents may be obtained from the same address on payment of 1D. 2 per set. Tenders must be accompanied by a deposit of 1D. 15,000. The tender No. is IRRS/R/1/60. The closing date is June 1, 1960. No further information is available at the Board of Trade. The Board of Trade reference is ESB/10400/60.

From Greece:

70 items of cylindrical and conic head drills in various sizes.

The issuing authority and address to which bids should be sent is the Hellenic State Railways, 12B Polytechniou Street, Athens. The tender No. is 4580. The closing date is May 3, 1960. The Board of Trade reference is ESB/10928/60.

44 items of grinding wheels.

The issuing authority and address to which bids should be sent is the Hellenic State Railways, 12B Polytechniou Street, Athens. The tender No. is 4575. The closing date is May 3, 1960. The Board of Trade reference is ESB/10564/60.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

Notes and News

B.T.C. Harbour Charges Schemes Inquiry Postponed.—The public inquiry into the British Transport Commission, Fleetwood, Grimsby, Hull, and Lowestoft, Harbour Charges Schemes, 1960, which was to be held in the Niblett Hall, Temple, E.C.4 on May 3, has been postponed. The new date for commencement of the inquiry has not yet been arranged.

British Railways Amateur Boxing Championship.—The inter-Regional finals of the British Railways Amateur Boxing Championships were held at the Royal Albert Hall, London, on April 22. The challenge shield, which was won by the Southern Region, was presented by Sir Brian Robertson, Chairman of the British Transport Commission, and President of the British Railways Amateur Boxing Association. Last year the shield was held jointly by the Southern and Western Regions.

Southern Railway Dramatic Society.—The Southern Railway Dramatic Society celebrates its 21st anniversary this year. Since it was formed in 1939 at the outbreak of war to entertain troops and hospitals in and around London, it has done a remarkably good job for a wide range of charities. It has also attained a very high standard of performance, which was enhanced by last week's presentation of J. B. Priestley's comedy "When We Are Married," which is the play of the 1960 spring tour of the society. The cast included such stalwarts as Miss Phyllis Brain who played the part of Clara Soppitt. Mr. Harry Ling was Herbert Soppitt. The Parkers were well played by Mr. Gerald Knight and Miss June Thomas, and the portrayal of the Helliwells was safe in the hands of Mr. Alan Wood and Miss June Earnest. Miss Ivy Hoodless as Mrs. Northrop and Miss Angela Viney as Ruby Birtle gave good performances, as did Mr. William Makepeace as Gerald Forbes and Mr. John Ross as Fred Dyson. The part of Henry Ormonroyd was well taken by Mr. Brian Davies. Miss Mildred Dutton, Miss Pamela Cowland and Mr. Francis Drake made the most of the parts of Lottie Grady, Nancy Holmes and the Rev. Clement Mercer.

Proposed London Ring Road over Rail Tracks.—A 25-mile ring road around London, built over existing railways and tunnelling under the Thames from Rotherhithe to Poplar has been proposed by the British Road Federation. The project, which would take seven years to complete and cost £83,000,000, has been submitted to Mr. Ernest Marples, the Minister of Transport. It is a rival to the London County Council £17,000,000 road improvements plan submitted last October.

New Map of L.T.E. Underground.—The well-known diagrammatic poster map of the London Transport Underground, has been re-drawn. The new quad royal map is now being displayed at the 279 Underground stations. It is easier to read: only main interchange stations are shown in capital letters, and these specially marked to indicate interchange with British Railways or other Underground lines. It is more geographical in the layout of the seven lines. Travel information for passengers to air terminals, London Airport, and main-line stations is given for the first time. Stations which close on Sundays are also marked. The map is designed so that the Central London area, bounded, roughly, by the Circle Line, can be reproduced for display in Underground trains, alongside the route diagrams in every car. The new train maps are to be introduced later this year. London Transport Executive is also bringing out a pocket version of the new map when stocks of the present type are exhausted.

British Electrical Power Convention.—The Twelfth British Electrical Power Convention will meet at Bournemouth from May 30 to June 3 under the Presidency of Viscount Chandos, Chairman of Associated Electrical Industries Limited. The Convention, the theme of which will be "The New Horizon," will discuss papers on subjects including "Electrical Manufacture," "Electricity Supply," "Electrical Export," and "Electricity in the Home." Further information can be obtained from Mr. John M. Fraser, Press Officer, British Electrical Development Association, 2, Savoy Hill, London, W.C.2.

Through Rail Tickets from London to Moscow.—Arrangements have been concluded with the Continental Administrations for the issue of through tickets from Liverpool Street Station or Harwich, British Railways, Eastern Region, to Minsk or Moscow in the Soviet Union via Hook of Holland from May 29. The return fare, first class, London to Moscow is £47 18s., and the supplementary charge for a first class sleeper from Hook of Holland is £22. In connection with the Harwich-Hook of Holland day route a first class through sleeping car with double compartments will operate from May 29 on Tuesdays, Wednesdays, Fridays, and Sundays. The service will operate from Moscow on Mondays, Wednesdays, Fridays and Sundays. The throughout journey time is 59 hr.

National Union of Manufacturers' Statement on Rates Increase.—The National Union of Manufacturers stated earlier this week that the British Transport Commission's announcement that no general increase in freight charges was contemplated seemed designed to "gloss over what may be, in fact, a very considerable increase in freight costs, particularly in certain trades and for the smaller firms." On May 15, the N.U.M. pointed out, charges would be raised by 10 per cent on all consignments under 3 cwt. "For a number of light industries," the Union stated "this may in fact cover almost every consignment at present sent by rail. Industry already lacks confidence in the railways' freight services. A further sharp increase in charges will not help to restore its confidence."

British Interest in Mauretanian Iron Ore Project.—Editorial reference was made in our February 19 issue to the plan to build a 400-mile railway to move iron ore from the interior of Mauretania where deposits are to be developed. A new company, British Ore Investment Corporation Limited (B.O.I.C.), has taken over, with other investments, the British Steel Corporation Limited, 20 per cent interest in Société des Mines de Fer de Mauretanie (Miferma), a £60 million project of which the capital, equivalent to about £19 million, is being subscribed with French, Italian, and German interests. The ultimate intention of Miferma is to produce 6,000,000 tons of iron ore a year, to be transported by rail 400 miles to a port to be built near Port Etienne, in Mauretania. B.O.I.C. has also taken over the 30½ per cent British participation in Compagnie Minière de Conakry, in the Republic of Guinea. The share capital of B.O.I.C. amounts to £5 million. The company has been formed by nine of the principal British steel-making companies using imported ore and by the British Steel Corporation Limited, an investment-holding company associated with the British Iron

Opening of the Kingsferry Bridge

(*See last week's issue*)

Mr. K. W. C. Grand, Member of the British Transport Commission, being presented to the Duchess of Kent at the official opening of the Kingsferry Bridge

& Steel Federation. The main object of B.O.I.C. is to hold investments in overseas ore-mining companies, a function formerly undertaken for the British steel industry by British Steel Corporation alone.

Improvements at Walsall Bradford Street Goods Depot.—Work has started on construction of a new goods terminal and coal depot at Walsall Bradford Street, British Railways, London Midland Region, and is expected to be completed by the end of the year. It involves laying out additional sidings for handling traffic from Bescot Marshalling Yard, and alterations in the office accommodation and staff amenities. The main contractors are Sir Alfred McAlpine & Sons Ltd.

Excursions to Lincolnshire Tulip Fields.—The North Eastern Region of British Railways is to run Sunday excursions in May to Grantham, where motorcoaches will provide an escorted tour of the Lincolnshire bulb fields. Trains will run on May 1 from Bradford Exchange, Batley, Dewsbury Central, Ossett, Huddersfield, and Mirfield, and on May 8, from Scarborough Central, Malton, Harrogate, Starbeck, Knaresborough, York, Selby, and Hull, with another train from Leeds Central, Wakefield Westgate, and Doncaster.

Attendance at the Electrical Engineers Exhibition.—When the ninth Electrical Engineers Exhibition closed at Earls Court, London, on April 9 the total attendance figure was 75,962, over 10 per cent more than in 1959 when the figure was 68,352. The total of overseas visitors who registered at the reception centre was 886 and they came from 76 countries. This was a 41·9 per cent increase over the 1959 figure of 639 overseas visitors from 71 countries. The overseas figures included 189 visitors from the European Free Trade Association area, 299 from the rest of Europe, 46 from America and Canada, and 67 from Australia and New Zealand. The remaining visitors, from the Far East, Near East, Central and South America, and the West Indies, amounted to 285.

Halcrow Bequest Awards for Civil Engineering Papers.—The Institution of Civil Engineers announces the establishment of the Halcrow Bequest, provided for in the will of the late Sir William Halcrow, President of the Institution in 1946-47, who died in October, 1958. The bequest takes the form of an annual premium of £50 to be awarded to the author of the best paper published by the Institution on specified subjects. These are: docks and harbours, tunnels, and hydro-electric power, among subjects in which Sir William Halcrow specialised. Only Corporate Members of the Institution of Civil Engineers are eligible. The subjects will be changed in a three-year cycle. Papers delivered over the previous three years on any one subject will be considered.

Railway Fire-fighting Competition in Glasgow.—The finals of the British Railway, Scottish Region, annual competition for efficiency in fire fighting, were held on April 19 at the North West Fire Station, Glasgow. Teams from all parts of Scotland took part. The winners were: Two-man Extinguisher Contest, Thornton Motive Power Depot; Three-man Hydrant Contest, Aviemore; Five-man Trailer Pump Contest, Edinburgh Waverley (Carriage & Wagon). Prizes were presented by Colonel D. H. Cameron of Lochiel, Chairman of the Scottish Area Board, British Transport Commission. The winning teams in each event will represent the Scottish Region in the Inter-Regional Competition to be held in London on May 31.

Overhead Line Tests in the Eastern Region.—A 7½-mile section of overhead line between Broxbourne and Hertford East, British Railways, Eastern Region, was energised at 25 kV. last Monday to enable the installation to be tested in readiness for trial train running due to start on May 23. Further sections will be energised as the work of electrification progresses. The work is being arranged in such a way as not to affect present steam services.

International Machine Tool Exhibition.—Compared with the last exhibition organised by the Machine Tool Trades Association in 1956, stand space at this year's International Machine Tool Exhibition to be held at Olympia, London, on June 25 to July 8, has been increased by 21,117 sq. ft. to 287,204 sq. ft. The number of stands available is 295 against 261. Of the total number of exhibitors 107 will display British built metal-cutting or metal-forming machine tools. Foreign machines will be shown on the stands of 45 importing members of the Association.

Bedford Diesel Service Satisfactory.—A meeting was held recently, attended by Mr. R. L. E. Lawrence, Divisional Traffic Manager, London, British Railways, London Midland Region, and the Joint Committee of Local Authorities, to review the St. Pancras-Bedford diesel service introduced last January. The spokesman for the Joint Committee congratulated the railway management on the success of the scheme. The London Midland Region stated it would increase the numbers of vehicles in service if this was found necessary and would remove the armrests between the seats to increase seating room. The meeting was attended by Mr. C. J. Allen, who is technical adviser to the committee.

Scottish Exports by Rail Across Europe.—A 1,300-mile rail journey starting from Clydebank West Goods Station, British Railways, Scottish Region, on April 1, took a wagon-load of Scottish exports to an exhibition in Milan. This consignment of 12 tons of fabricated steelwork will be used in the construction of the English school at the Milan Triennale Architectural Exhibition. The method of construction which will be used for the project was designed by Brockhouse Steel Structures Limited in collaboration with the Consortium of local authorities, and the design of the Milan school has been carried out by the Nottinghamshire County Architect. To give through rail transit from Clydebank to Milan, a German Federal Railway wagon was provided, and the journey was *via* British Railways Harwich-Zeebrugge train ferry, Belgium, Germany, and Switzerland.

Rail-Rover Tickets in the Southern Region.—Rail-rover tickets available at weekends are again being issued this year by British Railways, Southern Region, in three country areas near London. They are available now on Saturdays, Sundays, and Bank Holiday Mondays until October 30. Each ticket costs 10s. (half-fare for children) and allows the passenger unlimited travel in one area of the day he buys it. The three areas are: Area 1 (Riverside), bounded by Victoria, Waterloo, Hounslow, Windsor & Eton Riverside, Virginia Water, Weybridge, Hampton Court and Shepperton; Area 2 (Surrey Hills), bounded by Victoria, Charing Cross, Waterloo, Holborn Viaduct, Woking, Guildford, Dorking North, Deepdene, Redhill, Epsom Downs and Tattenham Corner; and Area 3 (Kent & Surrey Countryside), bounded by Victoria, Charing Cross, Waterloo, Holborn Viaduct, Clapham Junction, Balham & Upper Tooting, Streatham, Tattenham Corner, Redhill, Caterham, Hurst Green, Hayes, Westerham, Lewisham, Hither Green, Swanley, Otford and Sevenoaks. The areas are shown on handbills at all Southern Region stations. There are also rail-rover tickets costing 3s. for dogs.

G. D. Peters & Co. Ltd. Results.—During the year ended December 26, 1959, G. D. Peters & Co. Ltd. incurred a net loss of £14,603 compared with a profit of £104,328 in the previous financial year. The dividend is 5 per cent (10 per cent).

Record Steel Production.—The output of steel in Britain in March was at a record level of 485,100 tons a week, compared with 482,200 tons in February and 362,700 tons in March, 1959. Production for the first quarter of 1960 averaged 480,000 tons a week, 35 per cent higher than in the first quarter of last year, and 8 per cent better than the previous highest quarterly figure attained in the last quarter of 1959.

New Subsidiary for Fleming—B.A.O. Group.—Plans have been made to widen the range of products of the Safety Division of J. & R. Fleming Limited, manufacturers of industrial eye protective equipment. To market all articles for industrial use manufactured by the Fleming—B.A.O. group of companies, a new subsidiary, Optoshield Limited, has been formed. Names of the newly-appointed General Sales Manager and Safety Sales Manager are given in the Personal columns this week.

Road Haulage Association Report.—The report and accounts for the year ended December 31, 1959, of the Road Haulage Association Limited show an excess of income over expenditure for the year amounting to £9,088, which has been added to the General Fund at December 31, 1959. The amount of the General Fund at January 1, 1959, was £126,146 to which has been added a repayment of Income Tax for the fiscal years 1951/52 to 1957/58 inclusive, of £3,835. The allocation of this sum between Head Office and the Areas will be made during 1960. Claims for subsequent years have not yet been agreed and are not included in the accounts.

Passenger Charged after Carriage Door Accident.—It was alleged in court at Berwick-on-Tweed on April 22 that because a 34-year-old commercial traveller left a train carriage door open, a railway porter lost his legs. The traveller was released on £50 bail after being committed for trial at quarter sessions. The charge against him alleged that he left the door open while the train was in motion "endangering the safety of persons on the railway." Witnesses stated that they shouted to the passenger to stay in the coach as the train started to pull out, but that he jumped out, and as the porter tried to shut the door, he slipped and fell under the wheels. It was stated that the porter, was making a good recovery in hospital.

Demolition Work at Manchester London Road Station.—Demolitions at London Road Station, Manchester, British Railways, London Midland Region, began on April 22, when the final phase of the reconstruction work was started. Work will continue through the summer months until September, when the first electric trains will be introduced between Manchester and Crewe. During this time the track layout will be altered to allow of two additional platforms, colour-light signalling will be installed, and the overhead electrical equipment will be erected. As a result many of the London Midland Region express trains from Euston and St. Pancras will run into Manchester Victoria instead of London Road, and the running

times will be extended by about 15 min. In the reverse direction, although some of the main line trains from Manchester will still use London Road, others will leave from Manchester Victoria.

Ransome & Marles New Leicester Office.—The Ransome & Marles Bearing Co. Ltd. has moved its Leicester area office from Great Central Street to De Montfort House, 223, Belgrave Gate, Leicester. The telephone numbers are unchanged.

May Excursion Trains as Usual.—British Railways, London Midland Region, have announced that, after a careful review of the freight traffic position, the full programme of excursion trains will be run during May.

A. A. Jones & Shipman Limited Results.—Mr. F. G. Morris, Chairman, A. A. Jones & Shipman Limited, has stated that the company proposes to increase the authorised capital to £700,000 by creating £1,400,000 ordinary shares of 5s. The board may decide to issue new shares later in the year. Net profit in 1959 amounted to £126,161 (£55,642) and the dividend is 30 per cent (25 per cent).

Craven Bros. (Manchester) Ltd. Dividend Increased.—The dividend of Craven Bros. (Manchester) Ltd. has been raised by 5 per cent to 15 per cent for 1959 with a 10 per cent final dividend. The company proposed a one-for-one scrip issue to holders registered on April 23 by capitalising £700,000 of reserves. After U.K. tax of £110,000 (£107,000), the net profit of £148,543 compares with £126,111, of which the dividend takes £64,312 (£41,956).

Morgan Crucible Co. Ltd., at New York Fair.—The Morgan Crucible Co. Ltd., will exhibit a working muffle-type electric furnace, fitted with Morgan Crusilite silicon-carbide electric furnace elements, at the group stand of the Engineering Centre at the British Exhibition to be held in New York on June 10-26. Also on show will be Purox recrystallised alumina oxide refractories of high purity for high temperature applications. Morganite heavy-duty resistors for high-voltage circuit breakers and transformers, Morganite fully sealed potentiometers for radio and electronic uses, and Morganite brush holders for electrical machines.

First "Land Cruise" in Scotland Since the War.—The first post-war railway land cruise left Edinburgh Waverley at 9.50 p.m. on April 22. The all-sleeping-car train conveyed 110 first class passengers on the first stage of a week-end visit to the tropical gardens at Inverewe. Next morning, at Inverness passengers changed to a restaurant car with observation car attached for Achnasheen, whence they travelled by motorcoach to Inverewe. Returning by train to Inverness, the visitors spent the night in the sleeping car train. On Sunday morning, the restaurant car train conveyed them to Culloden Moor, with an opportunity to attend morning service at Daviot Church. Later that day, a visit was made to Blair Castle and the Pass of Killiecrankie. The tour ended with arrival at Waverley at 8.35 p.m. on Sunday.

Railway Benevolent Institution.—At a meeting on April 25, the Board of the Railway Benevolent Institution granted annuities to four widows and five members involving an additional liability of £224 per annum. One hundred and twenty-five gratuities were also granted amounting to £1,185 to meet cases of immediate necessity. Grants made from the Casualty Fund during the month of March amounted to £1,623. The annual Flag Day collection will be held throughout all Regions of British Railways on June 17. The funds of the Institution are available for the relief of need and distress among railway staff, whether contributors or not, and the Board hope that everyone will co-operate to ensure the success of the appeal.

Forthcoming Meetings

May 4 (*Wed.*).—Electric Railway Society, at the Fred Tallant Hall, 153, Drummond Street, N.W.1, at 7.15 p.m. Papers on "British Railways audible warning system," by Mr. Bell, and "Swiss narrow gauge railways," by Mr. Hunt.

May 5 (*Thu.*).—Model Railway Club, at Keen House, Calshot Street, King's Cross, N.1, at 7.45 p.m. A talk on "The Southwold Railway," by Mr. E. R. Boston.

May 5 (*Thu.*).—Railway Correspondence & Travel Society, Sheffield Branch, at Livesey-Clegg House, Sheffield, at 7.30 p.m. Paper on "Railway transportation in France during the second world war," by Mr. J. Blundell.

May 6 (*Fri.*).—The Railway Club, at the Royal Scottish Corporation, Fetter Lane, E.C.4, at 7 p.m. Paper on "Modern railway signalling developments," by Mr. P. Broadley.

May 13 (*Fri.*).—Permanent Way Institution, East Anglia Section. Visit to Edgar Allen & Co. Ltd., Sheffield.

May 14 (*Sat.*).—Permanent Way Institution, London Section. Visit to new carriage depot at Ilford, Essex.

May 16 (*Mon.*).—Historical Model Railway Society, at Caxton Hall, Westminster, S.W.1, at 7 p.m. "The Dartmouth & Torbay Railway," historical description by Mr. I. H. Smart.

May 21 (*Sat.*).—Railway Correspondence & Travel Society, South of England Branch, at the Junction Hotel, Eastleigh, at 6.30 p.m. Paper on "Some footplate experiences," by Mr. A. F. Cook.

May 26 (*Thu.*) to June 8 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society. Scandinavian Tour.

May 27 (*Fri.*) to June 2 (*Thu.*).—Permanent Way Institution, all sections. Summer Convention at Ostend, Belgium.

May 27 (*Fri.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, S.W.1. Joint symposium with the Aluminium Development Association on the application of aluminium to railway rolling stock. Morning session, 10 a.m. to 12.30 p.m. Afternoon session, 2.30 to 5 p.m.

OFFICIAL NOTICES

EAST African Railways and Harbours Administration. ASSISTANT MECHANICAL ENGINEER. Pensionable appointment. Salary £1,170—£1,755. Free passages. Free furnished quarters for first tour; thereafter furniture rental is payable.

Candidates 25—35 years must have passed or be exempt from Parts I and II of the examination of the Institution of Mechanical Engineers, and have served an apprenticeship with a British railway or a firm of locomotive or diesel engine builders, followed by at least four years' practical experience in the Mechanical Department of such an undertaking.

Write Director of Recruitment, Colonial Office, London, S.W.1, giving full names, age, qualifications and experience, quoting BCD 173/06/D15.

BUYER required, preferably with experience of Railway Materials, both New and Second Hand. Apply stating age, experience and salary required to the Secretary, Isca Foundry Co. Ltd., Newport, Mon.

Railway Stock Market

With sentiment in stock markets dominated by expectations of a credit squeeze move by the Chancellor of the Exchequer, share prices have again moved lower on balance, though, later, a firmer tendency was indicated. Uncertainty about the move to curb credit, foreshadowed in the Budget speech, has made for the sharp fall in share prices during the past few weeks. Buyers have been holding off until the position is clarified, and there has been selling, though this was not nearly as heavy as the drop in share values might suggest. Mr. Heathcoat Amory has said that some restriction on the expansion of credit and the hire purchase boom is necessary to guard against inflation. In recent months imports have been growing, partly to supply goods for the home market, but the Chancellor wishes industry to give still greater emphasis to export trade.

Foreign rails have held steady with Antofagasta again 13¾, while the preference stock was fractionally better at 28¾, and the 5 per cent (Bolivia) debentures continued at 100.

Costa Rica ordinary stock gained a point at 31; the first debentures remained at 90 and the second debentures at 94½.

International of Central America eased from $25½ to $23½, but the preferred strengthened from $111½ to $114. Chilean Northern first debentures firmed up to 57½. Mexican Central "A" bearer debentures were 57½. Guayaquil & Quito assented bonds were again 77. United of Havana second income stock kept at 6 and San Paulo Railway 3s. units at 1s. 4½d.

Canadian Pacifics improved from $47¾ to $48, while the preference stock was better at 59½ and the 4 per cent debentures 63⅞. White Pass shares receded to $13¾.

Nyasaland Railways shares remained at 10s. and the 3½ per cent debentures at 51½. West of India Portuguese capital stock and the 5 per cent debentures have kept at 112 and 93½ respectively.

Among engineering, Beyer Peacock 5s. shares have declined from 8s. 1½d. to 6s. 7½d. on the results. But Birmingham Wagon held steady at 40s. 7½d., Gloucester Wagon 10s. shares at 12s. were virtually the same as a week ago, while Wagon Repairs 5s. shares remained at 11s. 6d. G. D. Peters were again quoted at 20s. Elsewhere Charles Roberts 5s. shares came back from 13s. 9d. to 13s.

Westinghouse Brake lost 1s. at 49s. 6d., but elsewhere, helped by Lord Chandos' remarks at the annual meeting, which emphasised the progressive policy being followed, Associated Electrical shares rallied strongly on balance, and were 52s. 7½d. compared with 50s. 4½d. a week ago. English Electric eased from 40s. to 39s. 7½d. and General Electric at 38s. (compared with 38s. 10½d. a week ago) also reflected the prevailing trend of markets. Vickers at 32s. rallied on satisfaction with the maintained 10 per cent dividend, which was regarded as indicating confidence in the outlook.

Broom & Wade 5s. shares strengthened from 18s. 7½d. to 18s. 10½d. and Clarke Chapman were better at 50s., but Babcock & Wilcox at 36s. 9d. reflected the cut in the dividend. Pollard Bearing 4s. shares were 34s. 6d., Ransomes & Marles 5s. shares 24s. 3d., and Stone-Platt eased to 54s. 9d., but T. W. Ward have been steady at 146s. 3d. Edwards Vacuum 4s. shares strengthened to 23s.

Steels were again lower, and elsewhere Guest Keen have fallen sharply to 83s. 6d., compared with 87s. a week ago. Davy United came back to 106s. 6d. Carrier Engineering were lower at 61s. 9d. and Acrow (Engineers) eased to 69s. 6d. with the prevailing trend.